1792A
EA04-07
5401
North Lake

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

ENVIRONMENTAL ASSESSMENT NO. OR090-04-07

North Lake Creek Thinning Project

INTRODUCTION

SUMMARY

This Environmental Assessment (EA) analyzes alternatives for timber harvest and other forest management activities within the North Lake Creek Planning Area of the Siuslaw Resource Area (see Map 1). Proposed activities include thinning, riparian enhancement, culvert replacement/removal and road improvement work. The planning area includes approximately 12,700 acres of Bureau of Land Management (BLM) lands which are located primarily in the Lake Creek Watershed (90%), and portions of the Upper Alsea River (9%) and Long Tom watersheds (1%). There are 9,000 acres of Matrix (GFMA and Riparian Reserve) and 3,700 acres of Late-Successional Reserve (LSR) Land Use Allocations (LUA). The majority of timber stands within the Matrix LUA (82%) fall within the 40-70 year-old age class. Of the remaining stands in Matrix, 17% are in the 0-30 year-old age class and 1% is in the 80 year and older age classes. Proposed actions would take place on BLM-managed lands within Matrix and Riparian Reserve LUA in the planning area.

PURPOSE OF AND NEED FOR THE ACTION

The purpose of this action is to provide a sustainable supply of timber from the Matrix LUA while maintaining forest health and productivity, and contributing to attainment of Aquatic Conservation Strategy (ACS) Objectives. The need is established in the Eugene District Record of Decision and Resource Management Plan (RMP) (June 1995), which directs that timber be harvested from the Matrix LUA, and that actions be taken to attain ACS objectives.

The Lake Creek Watershed Analysis (June, 1995), Long Tom Watershed Analysis (October, 2000), and South Fork Alsea Watershed Analysis (October, 1995) support the need for density reduction in the GFMA and Riparian Reserve to meet the above resource objectives.

CONFORMANCE WITH LAND USE PLAN

All alternatives are in conformance with the Eugene District Resource Management Plan (RMP) (June 1995), as amended. Under all action alternatives, Special Status Species surveys would be conducted as required consistent with survey protocols applicable at the time of the action, and known sites of Special Status Species would be managed consistent with the policies applicable at the time of the action.

Additional information is available in the North Lake Creek Thinning Project analysis file. This file and the above referenced documents are available for review at the Eugene District Office.

ISSUES SELECTED FOR ANALYSIS

The issues for analysis were developed based on comments received from the public during scoping and interdisciplinary team discussion. The issues are summarized below and serve to focus the analysis and comparison of alternatives.

ISSUE 1: What are the effects of each alternative on the output of timber volume?

Taking action in the North Lake Creek area would contribute to the Eugene District's Allowable Sale Quantity (ASQ). Action alternatives have been designed with additional management objectives that may affect the amount of timber volume available for harvest.

Measures: Number of board feet (million board feet) sold.

ISSUE 2: What are the effects of timber harvest and associated activities on the attainment of Aquatic Conservation Strategy (ACS) objectives?

Actions proposed within the Riparian Reserves may affect attainment of ACS objectives. Initial evaluation of this issue determined that ACS objectives 1, 4, 6, 7, and 9 would be maintained under all action alternatives, whereas effects on ACS objectives 2, 3, 5, and 8 may differ by alternative. Analysis of this issue will compare how each alternative contributes toward attainment of ACS objectives 2, 3, 5, and 8.

Measures:

ACS No. 2: Connectivity within watershed maintained, restored, or retarded by measuring the number of barrier culverts removed and miles of habitat for aquatic species increased

ACS No. 3: Physical integrity of the aquatic system maintained, restored, or retarded by measuring the number of stream crossings removed or added; and the number of stream miles with large woody debris added.

ACS No. 5: Sediment regime maintained, restored, or retarded by considering: (1) the miles of existing road with sediment delivery potential decommissioned; (2) the number of culverts added, replaced or removed; (3) the percent increase in short-term sediment delivery due to an increase in timber haul; (4) the percent decrease in long-term sediment delivery due to the addition of cross drains and road paving, and (5) the miles of road construction and road renovation with sediment delivery potential

ACS No. 8: Structural diversity maintained, restored, or retarded by considering the number of acres of Riparian Reserve treated to accelerate late-successional characteristics

ISSUE 3: What are the effects of timber harvest and associated activities to northern spotted owl foraging habitat within the home range of active owl sites?

The planning area contains portions of home ranges for four known spotted owl sites. Two of these are currently active. It is likely that the part of the planning area that lies within these active home ranges is used as foraging habitat for resident owls. Timber harvest could reduce foraging habitat within the home range of active owl sites. Analyzing this issue will define how each alternative affects foraging habitat.

Measures: Percent of foraging habitat remaining intact within the two active spotted owl home ranges

ISSUE 4: **What are the effects of timber harvest and associated activities to northern spotted owl dispersal habitat within the planning area?**

The planning area contains over 9,000 acres of dispersal habitat for northern spotted owls. Dispersal habitat provides a link between areas of late-successional reserves (LSRs) and small stands of late-successional habitat within the planning area. Timber harvest may reduce or degrade dispersal habitat in the short term (10-20 years), but may also improve dispersal condition in the long term. Analyzing this issue will allow comparison of how alternatives may affect the quantity and quality of dispersal habitat.

Measures: Percent of treated acres within the planning area with dispersal habitat degraded or removed

ISSUE 5: **What are the effects of timber harvest and associated activities on the productivity of harvestable mushrooms?**

The North Lake Creek planning area is a popular mushroom harvesting area in the Eugene District. During scoping, many local Triangle Lake/Horton residents stated that they enjoyed mushroom picking in the area. Research indicates that timber harvest could affect the productivity of mushrooms. Analyzing this issue will show how each alternative would affect the mushroom productivity within the planning area.

Measures: Percent of full mushroom productivity in the Matrix portion of the planning area and within timber harvest units compared to existing condition.

ISSUE 6: **What are the effects of timber harvest and associated activities on the spread of invasive non-native and noxious weeds?**

Ground disturbance and loss of canopy generally lead to an increase in invasive non-native and noxious weeds, as evidenced in literature review and observations on the Eugene District. The use of logging equipment and other vehicles may spread weed seeds. Several species of State of Oregon listed noxious weeds are present on roadsides and in recently thinned areas. False brome is of particular concern, as it is relatively shade-tolerant and can indefinitely dominate sites to the near exclusion of native plants.

Measures: Increased risk of weed invasion by considering acres of ground disturbance from thinning, road work, and landings.

ISSUE 7: **What are the effects of alternative design features on the cost of yarding, road construction and road renovation?**

Each of the action alternatives employs a different combination of logging systems due to design constraints, environmental concerns, and the extent of area treated. Costs of yarding, road construction, and road renovation would vary by alternative. Analysis of these costs will provide a means to compare cost-effectiveness among alternatives.

Measures: Cost per acre and cost per thousand board feet (MBF).

ISSUES CONSIDERED BUT NOT ANALYZED

What are the effects of timber harvest and associated activities on Off-Highway Vehicle use?

The effects of road closures on off-highway vehicle (OHV) use patterns and management was considered but not selected for analysis because it is beyond the scope of this EA. Effects of road closures on OHVs will be addressed in the environmental assessment for the Upper Lake Creek Recreation Area Management Plan (RAMP) which is expected to be issued by July 2004.

What are the effects of timber harvest and associated activities on sensitive soils?

The effects of yarding techniques on sensitive soils was an issue considered but not selected for analysis because Best Management Practices (BMPs) that limit yarding techniques on sensitive soils to cable and aerial yarding would be employed under each alternative. This would eliminate the possibility that yarding operations would not attain compaction standards as described in the Eugene RMP.

What are the effects of timber harvest and associated activities on Special Status Plants?

Under all alternatives, site-specific botanical surveys would be conducted during the design phase of individual projects prior to implementation. If any Special Status Plants are found, they would be managed in accordance with land use objectives and Special Status Species management policies at the time of implementation. Therefore, no additional analysis of this issue is necessary.

What are the effects of timber harvest and associated activities to marbled murrelets and Bald Eagles?

The effects of timber harvest and associated activities on marbled murrelets and bald eagles were considered but not analyzed for several reasons. No nesting habitat for either species would be harvested under any alternative. Seasonal restrictions would be required under all action alternatives to avoid disturbance to nesting murrelets on adjacent lands during harvest or haul activities. If any nesting eagles are found in the vicinity, seasonal restrictions would be implemented, if necessary to avoid any disturbance to this species from project activities. No incidental take for either species would occur due to harvest or haul activities associated with any of the action alternatives

ALTERNATIVES

Four action alternatives are analyzed that consider management activities on 5,500 acres of the Matrix (GFMA and Riparian Reserves). A No Action alternative is also analyzed. See Table 1 for a comparison of alternatives.

ALTERNATIVE A – NO ACTION

No timber harvest activities would be authorized under this EA. Under this alternative, no proposed management actions would be taken within the planning area that would contribute to the District's ASQ or to achieve ACS objectives. Actions specifically required by the RMP or by law or policy would occur, such as wildfire suppression, salvage harvest in response to insect, disease or fire, felling of hazard trees along roads or trails, road maintenance, and road construction by adjacent landowners. See the section below titled "Past, Present and Reasonably Foreseeable Future Actions" for more detail.

FEATURES COMMON TO ALL ACTION ALTERNATIVES

Thinning throughout the project area would focus on reducing stand density of conifers and would take place outside of hardwood dominated riparian zones. Harvest would not occur in late-successional stands (> 80 years old). Trees identified for harvest would generally be from the smaller diameter classes, and spacing would be varied by reserving the larger trees to a specific basal area. Proposed treatments would be implemented over a span of up to 10 years, beginning in 2005.

In order to reduce sediment from log haul, the Lake Creek Road from the Horton Market to the Metric Bridge (approximately 4 miles) would be paved, as described in Environmental Assessment No. OR-090-02-07. The beneficial effects of paving from reduced sediment are described in Appendix B.

Design features that would apply to the action alternatives are listed in Appendix A.

Applicable Best Management Practices (BMPs) described in the RMP would be followed for all proposed activities.

Estimated miles of road renovation and construction were based on GIS interpretation of the geographic area, field surveys, possible harvest locations and yarding systems, and IDT specialists' knowledge of the existing road system and the planning area. Actual locations, and renovation or construction length and design, would be determined at the time individual harvest units are designated. For the purposes of this analysis, definitions of various road activities are summarized as follows:

In all cases, old, compacted skid trails or logging roads from past activities would be utilized unless their locations would not meet land management standards. Road locations would be determined in conjunction with timber yarding BMPs.

- **Road Renovation** – existing roads that need to be returned to standards for timber haul. Activities could include clearing vegetation, grading, widening the road grade to minimum width standards, and adding a lift of rock.
- **New Road Construction** – Generally, new roads would be located on ridgetops or in areas having gentle to moderate sideslopes. New roads would be natural surfaced, built to minimum width standards (14 foot subgrade), with no ditches, reduced clearing limits, and outsloped where possible.
- **Decommissioning** – Renovated and newly-constructed roads would be decommissioned as described in Appendix A - Project Design Features No. 19.

Purchasers may be granted permission to rock newly constructed spur roads that begin from existing rocked or paved roads, except in the Riparian Reserves. Purchasers may be

required to remove rock upon completion activities as part of decommissioning requirements.

ALTERNATIVE B – COMMERCIAL THINNING OF GFMA WITH DENSITY MANAGEMENT THINNING OF RIPARIAN RESERVES

This alternative is designed to contribute to the District's ASQ, as well as provide for forest health and productivity. Approximately 4,900 (3,300 GFMA, 1,600 Riparian Reserve) acres would be thinned. Map 2 shows potential harvest areas and approximate locations of new road construction and road renovation. Thinning prescriptions would be the same for the upland Matrix and adjacent Riparian Reserves for ease of implementation. Thinning would be moderate (Relative Density = mid 30s) with a residual canopy coverage of 50-60 percent.

Stream crossing culverts and cross drains would be added or replaced as needed. An estimated 25-30 miles of road would be renovated, and 25-30 miles of temporary road would be constructed to access harvest units over the life of the project. Yarding would consist of approximately 2,940 acres of cable, 1,890 acres of ground-based, and 70 acres of helicopter. Coarse woody debris would not be created through management actions. A 100-foot untreated protection buffer would be left on each side of all streams.

ALTERNATIVE C – Commercial Thinning and Density Management Thinning to Protect and Enhance Northern Spotted Owl Habitat and Maintain Mushroom Productivity

This alternative is designed to achieve ASQ and forest health objectives, similar to Alternative B. Additional objectives are to maximize protection and enhancement of owl habitat and maintain mushroom productivity within selected portions of the planning area (see Map 3). Approximately 3,100 acres (2,200 acres of GFMA and 900 acres of Riparian Reserve) would be thinned.

Primary objectives for spotted owls under this alternative are to:

- maintain the amount of suitable habitat within the home ranges of active spotted owl sites close to or above 40%
- enhance dispersal opportunities and habitat connectivity between owl sites, Late-successional Reserves, and existing late-successional patches within the Matrix
- create coarse woody debris (downed wood and snags) throughout the planning area to improve habitat for owl prey species (i.e., small mammals).

In order to maintain suitable (nesting, roosting and foraging) habitat at close to 40% within the home range of the two owl sites, thinning would be deferred within the Horton home range. In the Alsea River home range, thinning would be limited in the outer portions.

The primary objective for mushrooms is to maintain mushroom productivity in the planning area by deferring harvest in areas of high productivity. These areas will also serve to prevent or minimize the spread of large false brome infestations to other sites within the planning area, and serve as undisturbed areas of dispersal habitat for owls.

Thinning prescriptions are as follows:

- within Alsea River owl home range: Moderately heavy thinning (Relative Density = high 20's) in GFMA and Riparian Reserves (200 total acres).
- within owl connectivity corridors: Moderately heavy thinning in GFMA (1,200 acres) and heavy thinning (Relative Density = low 20s) in Riparian Reserves (415 acres).

- remaining areas: Moderate thinning (RD=mid 30s) in GFMA (515 acres) and moderately heavy thinning (Relative Density = high 20s) in Riparian Reserves (940 acres).

To enhance wildlife habitat complexity, coarse woody debris would be created from 12-18" dbh retention trees as follows:

- in owl corridors, home ranges, and Riparian Reserves, four trees per acre would be girdled/topped for snags and four trees per acre would be felled for downed wood
- in remaining uplands (GFMA), two trees per acre would be girdled/topped for snags and two trees per acre would be felled for downed wood.

Some stands identified for heavy thinning, particularly managed plantations, would be subject to increased risk of stem breakage and blow down at the low stand densities necessary to promote structural development. In order to maintain stand stability, prescriptions would be modified during the project design phase as needed by increasing retained stand density (up to RD=mid 30s).

Stream crossing culverts or cross drains would be added or replaced as needed. An estimated 20-25 miles of road would be renovated, and 15-20 miles of temporary road would be constructed to access harvest units over the life of the project. Yarding would consist of approximately 1,960 acres of cable, 1,120 acres ground-based, and 20 acres of helicopter yarding. A 100-foot untreated protection buffer would be left on each side of all streams.

ALTERNATIVE D - Commercial and Density Management Thinning to Promote Further Stand Structure Development in Riparian Reserves and Minimize Short-term Impacts to Streams (Sediment Delivery)

This alternative is designed to achieve ASQ and forest health objectives, similar to Alternative B. Additional objectives are to emphasize further stand structure development on 20% (approximately 320 acres) of the Riparian Reserves and minimize short-term impacts to aquatic habitat from sediment delivery. Approximately 4,900 acres (3,300 GFMA and 1,600 Riparian Reserve) would be treated (see Map 4).

Design features would differ by watershed. In order to avoid impacts of sediment delivery to streams in the Lake Creek Watershed, the following the following design features would be implemented:

- no replacement of culverts in GFMA and Riparian Reserves
- no road construction or renovation in Riparian Reserves
- no construction of helicopter landings in Riparian Reserves, except at previously disturbed areas such as the vacant Hult Mill site or quarry sites

In the Alsea and Long Tom watersheds, new temporary road construction and culvert replacement would occur as needed. Approximately 20-25 miles of new road construction and 15-20 miles of road renovation would be required over the life of the project. Yarding would consist of approximately 2,430 acres cable, 1,420 acres ground-based, and 1,050 acres helicopter. A 100-foot untreated protection buffer would be left on each side of all streams.

Moderate thinning prescriptions (Relative Density = mid 30s) would be applied in GFMA and on 80% of adjacent Riparian Reserves. Heavy thinning (Relative Density = lower 20s) would be used to further accelerate development of late-successional characteristics on 20% (320 acres) of the thinned Riparian Reserves. Areas selected for heavy thinning would be naturally-regenerated stands which typically have trees with a wide range of diameters. Larger diameter trees with larger crowns would be retained primarily to provide for stand stability and minimize the risk of blowdown. These stands would be

scattered throughout the planning area to enhance structural variability across the landscape.

To enhance wildlife habitat, coarse woody debris would be created utilizing 12-18"dbh trees as follows:

- in Riparian Reserves, four trees per acre would be girdled/topped for snags and four trees per acre would be felled for downed wood
- in uplands (GFMA), two trees per acre would be girdled/topped for snags and two trees per acre would be felled for downed wood.

ALTERNATIVE E - Commercial Thinning and Density Management Thinning in Riparian Reserves to Enhance Aquatic Habitat Complexity/Structure

This alternative is designed to achieve ASQ and forest health objectives, similar to Alternative B. Additional objectives are to enhance aquatic habitat complexity and structure and minimize sediment delivery to streams in the Lake Creek Watershed. Under this alternative, approximately 5,500 acres (3,300 GFMA and 2,200 Riparian Reserve) would be treated (see Map 5).

Design features would differ by watershed. In order to avoid impacts of sediment delivery to streams in the Lake Creek Watershed below Hult Dam the following design features would be implemented:

- no replacement of culverts in GFMA and Riparian Reserves
- no road construction or renovation in Riparian Reserves
- no construction of helicopter landings in Riparian Reserves, except at previously disturbed areas such as the vacant Hult Mill site or quarry sites

In the Lake Creek Watershed above Hult Dam and in the Alsea and Long Tom watersheds, new temporary road construction and culvert replacement would occur as needed. Approximately 25-30 miles of new road construction and 25-30 miles of road renovation would be required over the life of the project.

Moderate thinning (Relative Density = mid 30s) up to 25 feet from streams would be used to increase structural complexity and increase opportunities for large woody debris to reach the streams. Stream buffers would be variable width, determined on a site-specific basis to maintain stream bank stability and shading. Stream buffer widths would generally include the primary shade zone, determined by a combination of tree height, hill slope, and stream aspect (USDA. 2004). In all cases, stream buffers would be at least 25 feet wide on either side of a stream. Thinning within the primary shade zone would maintain at least 50% of the original pre-treatment canopy cover. Yarding would consist of approximately 3,470 acres cable, 1,910 acres ground-based, and 120 acres helicopter. In order to add large woody debris to streams in the Lake Creek Watershed above Hult dam and in the Alsea and Long Tom watersheds, 100-160 trees (12-18" dbh) would be felled per stream mile in portions of the treated Riparian Reserves.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED

An alternative was considered that would maintain the availability of highly productive mushroom habitat over the long term. Under this alternative, the planning area would be harvested over a period of 25 years, at an approximately even rate. This rate (1/25 per year) was chosen, based on the approximate rate at which Matrix land is currently being harvested in the Siuslaw Resource Area as a whole. This alternative was not analyzed because the majority of stands within the planning area are currently in an overstocked condition suitable for thinning, and thinning beyond 5-10 years would not achieve forest health objectives. Thus, this alternative would not achieve the project's purpose and need.

Table 1. ***Comparison of Alternatives***

	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
Abbreviations used in table: RR = Riparian Reserves RD = Relative Density Mgt = management Decomm = Decommissioning Est = estimated	**No Action**	**Commercial Thinning GFMA** **Density Mgt Thinning RRs**	**Commercial/Density Mgt Thinning** • Protect & Enhance Spotted Owl Habitat • Maintain Mushroom Productivity	**Commercial/Density Mgt Thinning** • Promote Further Stand Structure Development in RRs • Minimize Short-term Impacts to ACS Objectives (Sediment Delivery)	**Commercial/Density Mgt Thinning** • Enhance Aquatic Habitat Complexity/ Structure
Harvest Area (See maps)	No harvest	• All operable acres available for harvest • 3,300 acres GFMA • 1,600 acres RR • 4,900 acres total	• No harvest in Horton owl circle • 200 acre limit in Alsea owl circle • 2,200 acres GFMA • ____ acres RR • 3,100 acres total	• All operable acres available for harvest • 3,300 acres GFMA • 1,600 acres RR • 4,900 acres total	• All operable acres available for harvest • 3,300 acres GFMA • 2,200 acres RR • 5,500 acres total
Silviculture (GFMA & Riparian Reserve)	• N/A	• 100' no-cut buffer on all streams • GFMA & RR moderate thin to RD=35	• 100' no-cut buffer on all streams **Alsea Owl Circle:** • GFMA & RR moderately heavy thin to RD=high 20s **Owl Dispersal Corridors:** • GFMA moderately heavy thin to RD=high 20s • RR heavy thin to RD=low 20s, dependant on stand **Remaining areas:** • GFMA moderate thin to RD=35 • RR moderately heavy thin to RD=high 20s	• 100' no-cut buffer on all streams • GFMA & RR moderate thin to RD=35 • *except* 20% RR heavy thin to RD=low 20s	• Variable width no-cut buffer to within 25' of streams • GFMA & RR moderate thin to RD=35
Coarse Wood	N/A	• None created by mgt activities	• Half snags, half downed wood **Owl Home Ranges, Owl Dispersal Corridors, & RRs:** • 8 TPA, 12-18" dbh **Remaining GFMA:** 4 TPA, 12-18" dbh	• Half snags, half downed wood • GFMA 4 TPA, 12-18" dbh • RR 8 TPA, 12-18" dbh	**Lake Creek Watershed above Hult Dam, Alsea & Long Tom watersheds** • Portions of treated RR fell 100-160 12-18" dbh trees per stream mile, toward streams

	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
Abbreviations used in table: RR = Riparian Reserves RD = Relative Density Mgt = management Decomm = Decommissioning Est = estimated	**No Action**	**Commercial Thinning GFMA** **Density Mgt Thinning RRs**	**Commercial/Density Mgt Thinning** • Protect & Enhance Spotted Owl Habitat • Maintain Mushroom Productivity	**Commercial/Density Mgt Thinning** • Promote Further Stand Structure Development in RRs • Minimize Short-term Impacts to ACS Objectives (Sediment Delivery)	**Commercial/Density Mgt Thinning** • Enhance Aquatic Habitat Complexity/ Structure
New Temporary Road Construction		• As needed to access acres; est 25-30 miles over life of project	• As needed to access acres; est 15-20 miles over life of project	• As needed to access acres; est 20-25 miles over life of project **Lake Creek Watershed** • No new const in RR	• As needed to access acres; est 25-30 miles over life of project **Lake Creek Watershed below Hult Dam** • No new const in RR
Road Renovation		• As needed to access acres; est 25-30 miles over life of project	• As needed to access acres; est 20-25 miles over life of project	• As needed to access acres; est 15-20 miles over life of project **Lake Creek Watershed** • No renovation in RRs	• As needed to access acres; est 25-30 miles over life of project. **Lake Creek Watershed below Hult Dam** • No renovation in RRs
Road/Skid Trail Decomm		• Decomm all new const & natural-surfaced renovated roads; decomm skid trails as needed	• Decomm all new const & natural-surfaced renovated roads; decomm skid trails as needed	• Decomm all new const & natural-surfaced renovated roads; decomm skid trails as needed	• Decomm all new const & natural-surfaced renovated roads; decomm skid trails as needed
Yarding		• Cable: 2,940 acres • Ground-based: 1,890 acres • Helicopter: 70 acres	• Cable: 1,960 acres • Ground-based: 1,120 acres • Helicopter: 20 acres	• Cable: 2,430 acres • Ground-based: 1,420 acres • Helicopter: 1,050 acres; no new landings in RRs or Lake Creek Watershed	• Cable: 3,470 acres • Ground-based: 1,910 acres • Helicopter: 120 acres; no new landings in RRs in Lake Creek Watershed below Hult Dam
Culverts		• Add or replace as needed for harvest	• Add or replace as needed for harvest	**Lake Creek Watershed** • No stream crossing culvert replacements **Alsea & Long Tom Watersheds** • Add or replace as needed for harvest	**Lake Creek Watershed below Hult Dam** • No stream crossing culvert replacements **Lake Creek Watershed above Hult Dam, Alsea & Long Tom watersheds** • Add or replace as needed for harvest

	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E
Abbreviations used in table: RR = Riparian Reserves RD = Relative Density Mgt = management Decomm = Decommissioning Est = estimated	**No Action**	**Commercial Thinning GFMA** **Density Mgt Thinning RRs**	**Commercial/Density Mgt Thinning** • Protect & Enhance Spotted Owl Habitat • Maintain Mushroom Productivity	**Commercial/Density Mgt Thinning** • Promote Further Stand Structure Development in RRs • Minimize Short-term Impacts to ACS Objectives (Sediment Delivery)	**Commercial/Density Mgt Thinning** • Enhance Aquatic Habitat Complexity/ Structure
Haul		• Winter season haul restricted to rocked or paved roads with little or no potential for sediment delivery to streams	• Winter season haul restricted to rocked or paved roads with little or no potential for sediment delivery to streams	• Winter season haul restricted to rocked or paved roads with little or no potential for sediment delivery to streams	• Winter season haul restricted to rocked or paved roads with little or no potential for sediment delivery to streams

EXISTING CONDITIONS

INTRODUCTION

GENERAL SETTING

This section describes key components of the existing environment. The resources in the planning area do not differ significantly from those discussed in the Eugene District Proposed Resource Management Plan/Environmental Impact Statement (RMP EIS) (Chapter 3). The following resources are also discussed in greater detail in the project file.

The North Lake Creek planning area includes portions of three fifth-field watersheds: Lake Creek, Upper Alsea River (referred to as Alsea in this section), and Long Tom River. The Lake Creek Watershed is located in Lane and Benton Counties, northwest of the city of Eugene, and includes the communities of Blachly, Horton, Triangle Lake and Greenleaf. The watershed lies at the northeastern headwaters of the Siuslaw River Sub-basin, and contains approximately 74,500 acres, of which BLM manages approximately 45%. There are approximately 13,000 acres of this watershed within the planning area.

The Upper Alsea River Watershed in Lane, Linn, and Benton counties. The watershed lies at the southeastern headwaters of the Alsea River Sub-basin and contains approximately 81,300 acres. The majority of BLM-managed lands within this watershed fall within the Salem BLM District. There are approximately 1,400 acres of this watershed within the North Lake Creek Planning area.

The Long Tom Watershed is located in Lane and Benton Counties, northwest of Eugene. The watershed lies at the southwestern headwaters of the much larger Upper Willamette River Sub-basin and includes the communities of Veneta, Monroe, and Junction City. The Long Tom Watershed contains approximately 262,900 acres of which approximately 21,800 acres (8%) are managed by the BLM.

UPPER LAKE CREEK SPECIAL RECREATION MANAGEMENT AREA

The North Lake Creek planning area boundary is the same as the Upper Lake Creek Special Recreation Management Area (SRMA). A Recreation Area Management Plan (RAMP) is currently being prepared for the SRMA (expected completion date is July, 2004). The area is used by the public for several dispersed recreation activities such as hunting, camping, horseback riding, target shooting, sightseeing, OHV use, mushroom gathering, and hiking. Most of this recreational activity takes place at or around Hult Reservoir, which is managed by the BLM.

HULT MARSH AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)

The Hult Marsh ACEC, once a log pond, now exhibits a botanically rich assemblage of aquatic, bog, marsh, and riparian vegetation, including habitat for two "BLM Assessment" plant species, *Lycopodiella inundata* (bog club-moss) and *Utricularia gibba* (humped bladderwort). The wetlands support a number of fish and wildlife species. Portions of Lake Creek within the ACEC are spawning areas for steelhead and cutthroat trout.

VEGETATION

CURRENT STAND CONDITIONS

There are approximately 9,000 acres of forest stands within the Matrix LUA (includes GFMA and Riparian Reserves) that range in age from early to late-seral stages (see Map 6). Extensive logging in the planning area occurred through the mid-1970's. By the mid-1950's, almost half of the planning area had been harvested. By the mid-1970's, 85 percent of the planning area had been harvested. As a result, the majority of the planning area (82%) consists of dense stands of Douglas-fir in the 40-70 year (mid-seral) age class

(see Map 6a). These stands were established through natural regeneration and planting following logging. Minor components include but are not limited to: western hemlock, western red cedar, bigleaf maple, and golden chinquapin. Many riparian areas are dominated by hardwoods, primarily red alder and bigleaf maple.

Several sections within the planning area were acquired through land exchange during the last decade. Pre-commercial thinning was accomplished on 3,225 acres, and aerial fertilization was completed on 1,300 acres (750 acres received both treatments). Some of the acquired acreage had been commercially thinned prior to acquisition. Land surrounding the planning area includes BLM-managed land with stands similar to the planning area and private commercial forest land with young timber or recently harvested areas.

SPECIAL STATUS PLANTS

No federally listed Threatened or Endangered plant species have been located during botanical surveys. Surveys for currently-listed special status vascular plants and lichens and bryophytes in the planning area are in progress.

The Survey and Manage program was discontinued in 2004. Nine species of rare plants which were covered under Survey and Manage are known to currently exist within the planning area:

Two are now Bureau Assessment Species, *Lycopodiella inundata* (bog club moss) and *Utricularia gibba* (humped bladderwort), that occur in the Hult Marsh ACEC, on the north and east edges of the reservoir. The former grows on partially submerged logs and peat mats, and the latter grows in quiet, shallow water. Beaver ponds probably provided habitat for these species prior to the construction of the reservoir.

Four are now Bureau Tracking Species and are known to occur in the planning area: *Poa laxiflora*, *Cetrelia cetrarioides*, *Platismatia lacunosa*, and *Usnea longissima*. *Poa laxiflora*, a native grass is found along larger creeks in the planning area. It grows on a variety of substrates with other herbaceous species, near the high water mark. Populations may be submerged during the winter. A population was also found on Prairie Mountain, on meadow edges, with 50% canopy cover to the south. Large old growth trees exist there, indicating a relatively stable ecotone.

The other three species that were formally Survey and Manage species are lichens.

A Eugene District Review Species, *Allotropa virgata*, occurs in the planning area on south slopes or ridges, in association with chinquapin, madrone or rhododendron. This species is a mycotrophic plant, deriving its nutrition from fungi, and is associated with an edible mycorrhizal fungus, matsutake (*Tricholoma magnivelare*). This species was originally on the Survey and Manage list, but was removed due to large numbers of populations in the High Cascades and southwest Oregon. However, it occurs infrequently on the Eugene District. Other District Review Species found in the planning area include *Fritillaria affinis*, and *Botrychium virginianum*.

NOXIOUS WEEDS AND NON-NATIVE PLANTS

Several State-of-Oregon-listed noxious weeds occur in the planning area: false brome, meadow knapweed, Canada thistle, bull thistle, Scotch broom, common St. Johnswort, Himalayan blackberry, and tansy ragwort. Meadow knapweed is found on roadsides and on private agricultural lands at lower elevations. It is generally not a problem on forested lands. Canada thistle, bull thistle, common St. Johnswort and tansy ragwort are common and widely scattered on roadsides, and can be found in recently logged areas. The larger shrubs, including Scotch broom and Himalayan blackberry, can form dense thickets along roadsides, and are also found in recently logged areas. Control of dense thickets of Himalayan blackberry can be particularly challenging, and these species can be detrimental to native plant diversity as well as reforestation. A large number of other non-native invasive species occur in disturbed areas and in meadows.

False brome can dominate disturbed areas to the near exclusion of other herbaceous species. It is more shade tolerant than other noxious weeds, and can thrive under thinned canopies. This grass is known to exist along roads in five sections of the planning area (T15S, R6W, Section 7; T15S, R7W, Sections 14, 16, 26, and 27). Road maintenance, particularly blading, appears to contribute to the spread of this species. In addition, OHV use is occurring on several areas with false brome and appears to be spreading the weed to un-maintained roads. As yet, false brome has not been found off roadsides in the planning area, and treatments to control this species on the District were begun in 2003.

Control measures - including hot foam applications (using specialized equipment) for false brome infestations, and cutting and grubbing of meadow knapweed, Scotch broom, and Himalayan blackberry infestations - are currently being implemented as part of a District-wide weed strategy.

EDIBLE MUSHROOMS

The Lake Creek Watershed above Hult Dam is the area requested most for commercial mushroom harvest permits on the Eugene District. Mushroom harvest permits in this area account for 50-85% of all Special Forest Product permits on the District, depending on the year. Based on permit requests and observations of mushroom productivity, Sections 12, 13, 14, 15, 16 and 24 in T15S, R7W appear to be the best for mushroom harvest (John Hegg, pers. com., 2004). The popularity of this area for mushroom collection may be due to a higher mushroom productivity or the accessibility and familiarity of this area to local residents; most likely it is a combination of these factors. The Prairie Mountain area, immediately to the north of the planning area, is also considered the most productive area for mushroom harvest on the Salem District (Rex Swartzendruber, pers. com., 2004).

Species harvested commercially include golden chanterelle (*Cantharellus formosus*), hedgehog (*Dentinum repandum*) and winter chanterelle (*Craterellus neotubaeformis*). Matsutake (*Tricholoma magnivelare*) and king bolete (*Boletus edulis*) are also found in the planning area. Of these, golden chanterelle is probably the most important economically, although winter chanterelle is also abundant. Winter chanterelle prefers well-decayed wood, but is also found on soil and humus. No commercial permits are issued for matsutake or king bolete, but signs of active collection have been noted in the area. All of these fungi are mycorrhizal, and they appear to be more abundant on south slopes and ridges.

WILDLIFE

THREATENED AND ENDANGERED SPECIES

Northern Spotted Owl (*Strix occidentalis caurina*)

Suitable Habitat

A general definition (as recommended by the USFWS) of northern spotted owl suitable habitat for this area is mixed Douglas fir stands 80 years old or older (late-successional forest) that provides nesting, roosting and foraging habitat. Approximately 5% (660 acres) of BLM lands in the planning area are 80 years or older (see Map 7). On a stand specific basis, some younger stands are considered suitable habitat if they contain sufficient late-successional forest characteristics to provide nesting, foraging, and roosting habitat. If the amount of late-successional habitat is low within the home range of a spotted owl pair, owls will forage in younger forest stands (generally at least 40 years old) that can support prey within their home range. These younger stands become essential foraging habitat for the owl sites and are considered suitable habitat when determining effects to the owl site. The home range size for spotted owls in the North Coast Province is (on average) an area with a 1.5 mile radius, or 4,765 acres.

There are four historical spotted owl sites located in the planning area and nine sites within 1.5 miles. Of the sites within the planning area, two (Alsea River and Horton) are currently occupied by owl pairs, as of 2003. The Horton owl site has been occupied since surveys began in 1991 and the Alsea River site has been occupied since 1996. The Horton owl site has 180 acres of late-successional habitat, which is 4% of its home range; the Alsea River owl site has 320 acres, or 7% of its home range. The small amount of late-successional habitat is not likely providing enough prey to support these owls; therefore, owls at both sites are most likely relying on 40-79 year old stands for foraging. The majority of the essential foraging habitat within both owl sites is 50 years old or older (80% for the Alsea River site and 96% for the Horton site).

The U.S. Fish and Wildlife Service considers an owl site to be at risk (reproductive failure or mortality) when it contains less than 40% of suitable habitat (1,906 acres) within its home range. The Alsea River site is currently above this 40% threshold (51%) for acres of nesting, roosting, and foraging habitat within the home range. The Horton Owl site is just below the threshold at 38% (1,836 acres) of nesting, roosting, and foraging habitat.

Dispersal Habitat

Juvenile owls move through dispersal habitat in the fall (most in September) and attempt to find an unoccupied territory to inhabit. Adult spotted owls without a territory use dispersal habitat until a more permanent territory becomes available. Dispersal habitat provides opportunities for both foraging and roosting. Young owls tend to move quickly through stands in the fall and spring, but may stay in one area through the winter. Some anecdotal evidence suggests that all other things being equal, owls prefer to disperse through drainages rather than cross ridges; however, research on dispersing owls shows that having a forested landscape, even fragmented forest stands, is the most important requirement for dispersing owls (Forsman et al, 2002).

Approximately 70% (9,300 acres) of the planning area is currently dispersal habitat for the northern spotted owl. Dispersal habitat is defined as forests stands with an average dbh of 11 inches and minimum of 40% canopy closure in which owls can roost and forage. These stands are typically 40 years old or older. On federal lands in the planning area, there are 8,610 acres of dispersal habitat (7,260 acres in the Matrix and 1,350 acres in the LSR). This includes 40-79 year old stands and an additional 660 acres of stands 80 years or older. There is no spotted owl critical habitat within the planning area.

Marbled Murrelet (*Brachyramphus marmoratus*)

Critical Habitat

All marbled murrelet Critical Habitat Units (CHU) on the Eugene District are in LSR LUA and are managed accordingly. The North Lake Creek planning area contains approximately 3,500 acres of CHU OR-04-j. Since no sections within the LSR LUA designation would be treated, there would be no effect to murrelet critical habitat within the planning area.

Suitable Habitat

Suitable habitat for marbled murrelets in western Oregon is generally defined as mixed Douglas-fir stands 80 years or older within 50 miles of the Pacific coast. Stands of this age provide the large branches and cover required by these birds for nesting. There are approximately 800 acres of suitable habitat in the planning area on federal and private lands. Approximately 660 acres of this habitat is on BLM-managed land.

Although these birds are closely associated with late-successional stands, younger stands capable of attaining suitable characteristics within 20 years and possessing some nesting structure could support nesting murrelets. There are approximately 3,100 acres of this potential habitat within the planning area.

The planning area lies within the 35 mile limit (most nesting occurs within this zone) of the inland nesting range of marbled murrelet in Oregon (USDA Forest Service et al. 1993, pp IV-15-IV-17). In 2002 and 2003, murrelet surveys were conducted in portions of the planning area utilizing both radar and standard protocol surveys. Although murrelet activity was documented, no activity was identified that qualified any stand as occupied (probable nesting) by this species. Additional areas of suitable habitat will be surveyed to protocol in 2004 and beyond until all potential habitat has been surveyed for two consecutive years.

None of the action alternatives would modify marbled murrelet suitable habitat. If habitat is found to be occupied, appropriate measures would be taken to protect occupied sites, consistent with NW Forest Plan guidance. The action alternatives *may affect but are not likely to adversely affect* marbled murrelets due to potential disturbance from activities during the late nesting period.

OTHER SPECIES OF CONCERN

Bald Eagle (*Haliaeetus leucocephalus*)

Suitable nesting habitat for bald eagles is forest 80 years and older within one mile of a lake, river or major tributary. Although occasional reports of adult eagles in the area during nesting season have been received, no nests have been located to date. The closest known bald eagle nesting site is located approximately 6.5 miles from the planning area. Hult Reservoir and Triangle Lake, 10 miles to the southwest, are popular winter foraging areas for this species due to an abundance of fish and wintering waterfowl.

To aid in the recovery of this species, Bald Eagle Habitat Areas (BEHAs) have been delineated around areas that have potential to support these birds. Stands totaling 100 acres have been designated within Section 25, T.15S, R. 7W, which is part of the LSR LUA in the North Lake Creek planning area. These areas were chosen based on stand age and a view of foraging sites at Hult Reservoir. Since no sections within the LSR LUA designation will be treated, there would be no affect to bald eagle suitable habitat. No bald eagles are known to nest within the planning area, so there would be no anticipated effects to the bald eagle due to disturbance. Because annual surveys are not conducted, disturbances associated with proposed activities (thinning, snag and downed wood creation, road building, stream enhancement, and weed removal) *may affect, but are not likely to adversely affect*, the bald eagle.

Western Pond Turtle (*Chrysemys picta*)

The Western pond turtle is a Bureau Sensitive Species and can be found in lakes, ponds, sloughs and slow-moving streams in western Oregon. Although there is a strong probability that this species historically occupied waterways in the planning area, there are no records of this turtle here. Hult Reservoir has potential to support this species. However, the presence of large-mouthed bass would hinder any establishment of turtles because juvenile turtles are prime prey for bass. In addition, heavy brush around the reservoir is currently a barrier to potential nesting.

Amphibians

Two Special Status Species are known to occur in the planning area, the Northern red-legged frog (*Rana aurora*), a Bureau Assessment Species, and the variegated salamander (*Rhyacotriton variegatus*), a Bureau Tracking Species. Northern red-legged frogs inhabit Congdon Creek above barriers where there are no fish and the water is quiet. Variegated salamanders live in small but permanent headwater streams that can be as small as a trickle, have beds of loose rock and gravel, and where water is moving and cool.

AQUATIC AND RIPARIAN RESOURCES AND FISHERIES

HYDROLOGY

The main drainages in the planning area are Lake Creek, Congdon Creek, Swartz Creek, Pucker Creek, Ferguson Creek, and South Fork of the Alsea River. The hydrologic, aquatic and riparian habitat conditions are described in detail in the watershed analyses for each of the three watersheds within the planning area and the Lake Creek Aquatic Habitat Management Plan (May, 2000). These documents are incorporated here by reference.

There are approximately 123 stream miles within the planning area. Stream density is about 5.3 miles/square mile. Most (about 75%) are 1st or 2nd order tributaries to larger streams. These lower order streams are typically confined and high gradient (>8%). The lower main stem reaches of Congdon Creek, Pucker Creek, and Swartz Creek; and most of the main stem reaches of Upper Lake Creek, Ferguson Creek, and South Fork of the Alsea River are generally low gradient (<2%), unconfined reaches with more developed floodplains.

Hult Reservoir is located on Lake Creek near the southern end of the planning area, upstream of Congdon Creek. This 55-acre reservoir is created by an earthen impoundment. It is 18 feet deep at its maximum and holds approximately 480 acre/feet of storage under typical pool elevation. Flow is typically uncontrolled over a spillway and fish ladder. Hult Reservoir has an effect on flows, stream temperatures, and sediment regimes. It is estimated that 50 to 80% of the sediment that flows towards the reservoir is retained in or above the reservoir, including a large majority of the coarse sediment. Some of the fine sediment passes through in suspension and probably remains in suspension until it reaches Triangle Lake, located about 10 miles downstream. Triangle Lake also has a large effect on flows, stream temperatures, and sediment regimes. It is estimated that Triangle Lake traps 80% or more of the incoming sediment.

Elevations in the planning area range from about 760 feet to 3,300 feet above sea level. Precipitation in this region is between 70-110 inches annually and the majority occurs in the form of rainfall between October and April. Areas most susceptible to rain-on-snow events are those above 2000 feet in elevation. Approximately 15% of the planning area is within the rain-on-snow zone, mostly in the northwest corner of the planning area.

More than half of the stream miles in the planning area have stream side vegetation zones dominated by mid-seral stands (40-70 years old). Approximately 4% of the stream miles are dominated by old forest (>200 years old), and remaining stream side zones are dominated by young (1-29 years old) stands or mixed conifer/hardwood vegetation.

Slope gradient varies from 0% to over 100% in the planning area. About two thirds of the planning area has moderately sloped topography (20% to 60% side slopes). Gentle (< 20%) side slopes occur on about one quarter of the planning area and steep side slopes (> 60%) occur on about tenth of the planning area. Many of the streamside areas along Congdon and Swartz Creeks are steep. Steep areas also occur northeast of Hult Reservoir in tributaries to Lake Creek, the headwaters of Lake Creek, and along the north side of Pucker Creek.

There are approximately 125 miles of road in the planning area. Road density is about 5.4 miles per square mile. About 55% of the roads have gravel surfacing and about 50% of the roads are mid-slope roads. Stream side roads are common along the tributaries and main stems of Lake Creek and the South Fork of the Alsea River. Stream side roads are also common along the main stems of Congdon and Pucker creeks.

Stream temperatures were monitored for the last few years in the main stem of Lake Creek above and below Hult Reservoir. Maximum recorded temperatures for sites above Hult Dam were between 60-64 degrees Fahrenheit and between 70-78 degrees Fahrenheit below the dam. These temperatures indicate that state water quality standards are being exceeded below the dam. Congdon Creek temperatures were monitored for one year (2003) and did not exceed state standards. Swartz Creek temperatures were monitored for one year (2003) and occasionally exceeded state standards. No temperature data is available for other streams within the planning area.

FISHERIES

The planning area includes a large stream network that is of vital importance to anadromous fish species which include coho salmon (*Oncorhynchus kisutch*)(listed threatened), searun cutthroat trout (*O. clarki*), Pacific lamprey (*Lampetra tridentata*), and steelhead trout (*O. mykiss*), (1995 Lake Creek Watershed Analysis) (see Map 8). Over the past two decades, installation of fish ladders at Triangle Lake and Hult Reservoir have expanded usable habitat for anadromous fish species in the Upper Lake Creek Basin. Coho salmon are known to spawn in Lake Creek and its tributaries up to Hult Reservoir. However, annual surveys conducted for coho salmon and steelhead trout have shown only the presence of steelhead in the planning area above Hult Reservoir. Recent sampling indicates that coho populations are being maintained in stream reaches below the Hult fish ladder. Of the estimated seven miles of suitable coho spawning and rearing habitat found within the planning area, only the two miles below Hult Reservoir are currently occupied.

Native resident fish species include cutthroat trout (O. clarki), brook lamprey (*L. richardsoni*), sculpins (*Cottus sp.*), redside shiners (*Richardsonius balteatus*), and speckled dace (*Rhinichthys osculus*). Approximately 50% of streams in the planning area are located above natural barriers and provide habitat for populations of cutthroat trout that might be genetically distinct. Further testing is needed to confirm this distinction. Non-native species have been introduced into Hult Reservoir, including centrarchids (warm-water species such as sunfish, bass, perch) and catfish (Ictaluris sp.).

Large woody debris (LWD) is limited in the planning area and the lack of in-stream structure in some areas has led to a decline in habitat quality. Limited habitat restoration (in-stream LWD) occurred on portions of the planning area over the past decade and is currently being monitored for effectiveness.

Prior to the 1990's, many stream reaches suitable for aquatic species use were inaccessible due to barrier culverts. Several culverts have been replaced following severe floods in 1996 and through cooperation with other agencies and landowners. The 2001 Lake Creek Transportation Management Plan (TMP) identified additional culverts that are major barriers to aquatic species in the planning area.

ENVIRONMENTAL CONSEQUENCES

This section explains and summarizes the direct, indirect, short-term, long-term, and cumulative effects of all the alternatives in relation to the identified issues.

This environmental assessment incorporates the analysis of environmental consequences, including cumulative effects, in the USDA Forest Service and USDI Bureau of Land Management "Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl," February 1994, (Chapters 3 & 4) and in the Eugene District "Final Proposed Resource Management Plan/Environmental Impact Statement," November 1994 (Chapter 4). These documents analyze most effects of timber harvest and other related management activities. None of the alternatives in this assessment would have effects on resources beyond the range of effects analyzed in the above documents. The following section supplements those analyses, providing site-specific information and analysis particular to the alternatives considered here.

PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past BLM timber sales implemented in the Lake Creek Watershed have included Ten High, Hult View, and Little Al; all located within the Matrix. On private lands, more intensive timber management actions, including clearcutting and broadcast burning, are occurring and are likely to continue in the foreseeable future. Future actions that are expected to occur within the planning area include timber harvest, recreation management activities (as directed by the RAMP), and the Mill Pond Road paving (scheduled to occur in 2004).

UNAFFECTED RESOURCES

The following resources are either not present or would not be affected by any of the alternatives: Areas of Critical Environmental Concern; prime or unique farm lands; wetlands; Native American religious concerns; cultural resources, solid or hazardous wastes; Wild and Scenic Rivers; and Wilderness.

ENVIRONMENTAL JUSTICE

Executive Order 12898 requires that federal agencies identify disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. A two-step screening process was used to determine the extent that EO 12898 might apply to the North Lake Creek project, as shown below.

Minority Populations and Low Income Populations: Guidance from the Council on Environmental Quality (CEQ 1997) states that minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent; or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. US Bureau of Census data from the year 2000 were used at three scales to examine minority populations: the State of Oregon, Lane County, and the Blachly/Triangle Lake zip code (this zip code area is adjacent to the planning area). The information is shown below in Table 2.

Table 2. ***Minority Populations***

	Oregon	Lane County	Blachly/ Triangle Lake
2000 population (total)	3,472,867	324,316	568
Black/African-American	1.6%	0.8%	0%
American Indian/Alaska Native	1.3%	1.1%	2.5%
Asian/Pacific Islander	3.2%	2.2%	1.3%
Hispanic	8.0%	4.6%	1.9%

Data from the above table illustrates that the minority populations in Oregon, Lane County, and the Blachly/Triangle Lake zip code area do not exceed 50 percent, and that the minority population of the affected area is not meaningfully greater than that at the next higher scale.

Low Income Populations: CEQ guidance identifies "low income populations" as persons living below the poverty level as defined annually by the Bureau of Census (CEQ 1997). According to 1999 data from the Bureau of Census, the poverty rates for Oregon, Lane County, and the Blachly/Triangle Lake zip code area are 12%, 15%, and 17%, respectively.

Disproportionately High and Adverse Impacts: Guidance from CEQ (1997) equates "disproportionately high" impacts as being analogous to "significant," as used by NEPA. The alternatives considered in this environmental assessment could affect two segments of low-income populations. One segment includes those individuals who seek employment in the logging industry. Implementation of any of the action alternatives is expected to provide job opportunities within Lane County. Low-income populations within Lane County may benefit from the additional job opportunities created by the action alternatives.

The second segment includes those groups that are commercially harvesting special forest products, primarily mushrooms. A recent study from the Olympic Peninsula in Washington suggests that many commercial mushroom harvesters' income status can be classified as "low income," and that the seasonal income derived from mushroom harvest may keep some families from requiring federal welfare assistance (Love et al. 1998). Alternatives that reduce mushroom productivity may affect harvest patterns of minority harvesters in various ways, including displacing harvesters to different areas or changing their harvest activity to a different product, for example.

However, the effect of this project on mushroom harvesters is difficult to quantify. The Eugene District is divided into six "core areas." Commercial mushroom harvest permits are issued for a specific core area. There is no restriction on the number of permits a person can obtain over the course of a year, and the permit holder can go anywhere on Eugene District lands within the permitted core area. Thus, while some change in the harvest pattern of harvesters might occur, there would be no restrictions on mushroom harvesting under any of the action alternatives.

ISSUE 1: What are the effects of each alternative on the output of timber volume?

Measures: Number of board feet (million board feet) sold:

Table 3. ***Issue 1***

	Results by Alternative				
	A	**B**	**C**	**D**	**E**
• Volume MMBF timber harvested	0				
Matrix	0	48	33	48	48
Riparian Reserve	0	22	17	23	29
Total (+/-10 MMBF)	**0**	**70**	**50**	**71**	**77**

Analysis:

Stand exams were done on 2,500 acres in the planning area during 2001-03. Volume estimates are derived from applying thinning prescriptions to these exams, which are then adjusted for growth based IDT specialists' knowledge. Actual acres to be harvested would not be known until all individual harvest units are designated, and the volume per acre on harvest units could vary from the estimates used here. Total estimated volumes for the alternatives could vary by plus or minus 10 MMBF.

ISSUE 2: What are the effects of timber harvest and associated activities on the attainment of aquatic conservation strategy (ACS) objectives 2, 3, 5, and 8?

ACS OBJECTIVE 2: *Maintain and restore spatial and temporal connectivity within and between watersheds, and drainage network connections including floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Measures: Connectivity within watershed maintained, restored, or retarded by measuring the factors below:

Table 4. ***Issue 2, ACS 2***

	Results by Alternative				
	A	B	C	D	E
• number of barrier culverts removed	0	2	2	0	2
• miles of habitat for aquatic species increased	0	1	1	0	1

Analysis:

Two stream-crossing culverts above Hult Dam are barriers to up- and downstream migration of resident and anadromous aquatic species.

Under Alternative B, C, and E, these culverts would be removed and replaced with aquatic-friendly passages. This would result in one additional mile of suitable fish habitat. *Spatial and temporal connectivity* would be **restored** to the area affected by these culverts.

Under Alternatives A and D, these culverts would remain in place and would continue to block migration of aquatic species. *Spatial and temporal connectivity* would be **maintained**.

ACS Objectives 3 and 5

Three different areas (see Map 9) were analyzed for physical integrity (ACS objective 3) and sediment impacts (ACS objective 5). The Lake Creek Watershed was analyzed as two areas, above Hult Dam and below Hult Dam, because Hult Reservoir has a strong influence on flows and the movement of sediment. The Alsea Watershed was analyzed as one area. The effects to the Long Tom River Watershed and the Five Rivers/Lobster Creek Watershed were not analyzed in detail because these areas are a small fraction of the planning area and all the action alternatives would alter existing conditions to a very small degree.

Most stream-crossing culverts in the planning area are constructed of corrugated metal (CMP). The useful life of a CMP culvert is about 25 years. Many of the existing culverts are between 40-50 years old, and are rusted, damaged or are otherwise in poor condition, and are at a risk for failure within 5-10 years. About 5,000-8,500 cubic yards of total fill exists at these locations. It is estimated that sediment delivery from removing or replacing culverts would be about 1 cubic yard or less for each instance (USDI-BLM, 2003).

The need for temporary culverts on proposed access routes was identified at one site in Alternative D and six sites in Alternatives B, C, and E. The estimated number of additional temporary culverts needed was based on the average number of crossings required for past timber sales (one crossing per 9,500 feet of new road construction). Stream crossings would be evaluated to assess risk, and culverts would be designed to minimize the risk of failure. Wherever harvest activities can be completed in one dry operating season, temporary culverts would be installed and removed in the same season. This would be the case with most temporary culverts. Culverts on roads that access stands requiring more than one operating season would be in place for one to two winter seasons; these culverts would be sized to accommodate 100-year storm events.

Cross drains allow road surface and ditchline water accumulation to flow under roads to downslope terrain, preventing road damage or failure. This accumulation can contribute to sediment delivery to streams at localized points. Existing cross drains In the planning area were installed in an insufficient number by today's standards to adequately allow sediment to filter through the landscape prior to entering streams.

Mainline haul routes would have an increased use from 2 to 10 years, and secondary routes that access individual harvest units would have increased haul for 1 to 3 years.

ACS OBJECTIVE 3: *Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

Measures: Physical integrity of the aquatic system maintained, restored, or retarded by measuring the factors below:

Table 5. ***Issue 2, ACS 3***

	Results by Alternative				
	A	B	C	D	E
• number of stream crossing culverts replaced	0	40-70	30-60	20-40	35-65
• number of temporary stream crossing culverts replaced	0	6-25	6-20	1-15	6-25
• number of cross drains added	0	50-75	35-60	45-70	50-75
• number of stream crossing culverts permanently removed	0	3-5	1-3	0-2	3-5
• number of stream miles with large woody debris added	0	0	0	0	5-25

Analysis:

Under Alternative A, the physical integrity of the aquatic system would be **maintained** in the short term. No culverts or cross drains would be replaced, removed, or added. As a result, eventual fill or stream crossing failures could **retard** the attainment of ACS objective 3 in the long term. Long-term restoration of stream channel integrity would occur slowly as natural development of trees that could function as large woody debris (to enhance physical integrity of stream channel) takes place.

Stream crossing culverts and cross drains

Under Alternatives B, C, D, and E, the number of stream crossing culverts or cross drains to be removed, replaced or added (Table 5) is dependent on the estimated acres to be accessed and the type of access required. Estimates were made using the potential access routes determined by the roads and transportation analysis.

Replacing rusted or damaged culverts would reduce the risk of fill failures. Replacement culverts would be sized to accommodate 100-year storm events, which would reduce the risk of failure in major flood events. There would be a long-term reduction in the risk of chronic and/or catastrophic failure of fill at these sites. The risk of failure would be eliminated at sites where existing culverts would be removed via road decommissioning. Removing or replacing culverts and adding temporary culverts would produce a temporary pulse of sediment (see ACS objective 5) but would be unlikely to affect the physical integrity of the stream channels.

The risk of major crossing failures due to temporary culverts would be low because of the site-specific analysis, design, and the short timeframe they would be in place.

Additional cross drains would reduce the risk of chronic catastrophic crossing failures, road-related landslides, and direct sediment delivery to streams.

Stream buffers

Under Alternatives B, C, and D, 100-foot untreated stream buffers would protect the physical integrity of stream banks and channels. Varied thinning prescriptions in the outer half of the Riparian Reserves would help restore the physical system by developing large trees more quickly than if left unthinned. This benefit would be small; however, because the trees would have a low to moderate likelihood of reaching the stream channels.

Under Alternative E, the proximity of Riparian Reserves treatments to streams (a minimum of 25 feet) would provide a greater potential of large trees reaching streams in a shorter time period than under the other alternatives. In addition, felling 100 to 160 trees per stream mile into the streams for large woody debris over an estimated 5 to 25 miles would contribute to the restoration of the physical integrity in the short term until larger trees can be added through natural processes.

Comparison among Alternatives B, C, D, and E as to effects on the attainment of ACS objective 3 shows no appreciable differences. Under Alternative D, fewer stream crossings would be replaced or added, and less short-term sediment would be expected, but benefits of replacing a greater number of old or damaged culverts would not be realized. Alternative D would have a slightly lower risk of failure from temporary culverts because fewer would be installed under this alternative. Overall, however, the numbers of culverts or cross drains replaced, added or removed, or thinning treatments applied in Riparian Reserves would have similar effects. Under these alternatives the physical integrity of the aquatic system would be **maintained and restored**.

ACS OBJECTIVE 5: *Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport*

Measures: sediment regime maintained, restored, or retarded by considering the following factors:

Table 6. ***Issue 2, ACS 5***

	Results by Alternative				
	A	**B**	**C**	**D**	**E**
Short-term effects (detrimental)					
• number of culverts					
existing replaced	0	40-70	30-60	20-40	35-65
existing removed	0	3-5	1-3	0-2	3-5
added temporarily	0	6-25	6-20	1-15	6-25
• estimated short-term increase in sediment from replacing, removing, or adding stream culverts – cubic yards/year	0	6-15	5-12	3-8	5-14
• miles road with sediment delivery potential					
renovation	0	5-9	4-8	0.5-4	4.5-8.5
construction	0	0-2	0-1.5	0-1.0	0-1.5
Total	0	0-11	1-9.5	0-5	0-10
• miles of haul route with sediment delivery potential	0	18-25	13-20	10-17	16-22
• percent increase in short-term sediment delivery due to an increase in timber haul (*after installation of culverts, cross drains, and paving*)	0	23%	21%	20%	22%
Long-term effects (beneficial)					
• number of culverts					
existing replaced	0	40-70	30-60	20-40	35-65
existing removed	0	3-5	1-3	0-2	3-5
• number of cross drains added	0	50-75	35-60	45-70	50-75
• miles decrease of roads that deliver sediment from adding cross drains:	0	3-7	2-5.5	2.5-6	3-7
• miles of existing road with potential sediment delivery decommissioned	0	1-2.5	0.5-2	0-1	1-2.5
• percent decrease in long-term sediment delivery (*due to addition of cross drains, road decommissioning, and paving*)	0	12-20%	8-16%	12-20%	12-20%

Activities proposed under the action alternatives could have short- and long-term effects on the sediment regime.

Short-term increases in sediment would be caused by:

- removing and replacing existing culverts
- adding temporary culverts
- renovating or constructing roads
- yarding
- increased road use from timber hauling and related activities

Long-term decreases in sediment delivery would be realized from:

- upgrading existing culverts
- removing existing culverts
- adding cross drains
- upgrading existing roads by adding rock
- paving 4 miles of road
- decommissioning roads

Table 6 shows the factors used to evaluate the effect of these activities. The quantities for each alternative were estimated using the potential access routes as determined by the roads and transportation analysis. Effects of paving on mitigating the increase of short-term sediment delivery and reducing long-term sediment delivery (after project completion) are discussed in Appendix B.

Direct, short-term sediment pulses are possible from removing and replacing stream crossing culverts and adding temporary culverts. It is assumed that these activities would be spread out relatively evenly over 5 to 10 years during the time span of the project, and that Best Management Practices (BMPs) would be followed. Estimated added sediment delivery would be about 1 cubic yard or less for each instance (USDI-BLM, 2003).

Most of the temporary culverts would be on secondary roads used to access individual harvest units, and would be installed and replaced in one summer (dry) operating season. Culverts on roads that access multiple harvest units within large tracts of land could be in place two summer and one or two winter seasons. Temporary culverts in place for one to two winter seasons pose a risk of failure that could add tens to hundreds of cubic yards of sediment from catastrophic failure per site.

Road renovation could vary from clearing vegetation, to grading and/or widening the road grade. Ground disturbance during renovation activities could increase delivery of sediment to streams. Most of this would be indirect delivery via cross drains, which is typically a small fraction of direct delivery. Design features would help minimize sedimentation.

The main sediment impact from road construction would be from adding temporary stream crossing culverts. Most of the new construction would be temporary, native surfaced roads used in the summer (dry) season. These roads would be water barred between logging seasons, which would reduce sediment flowing from them into existing roads and temporary crossings.

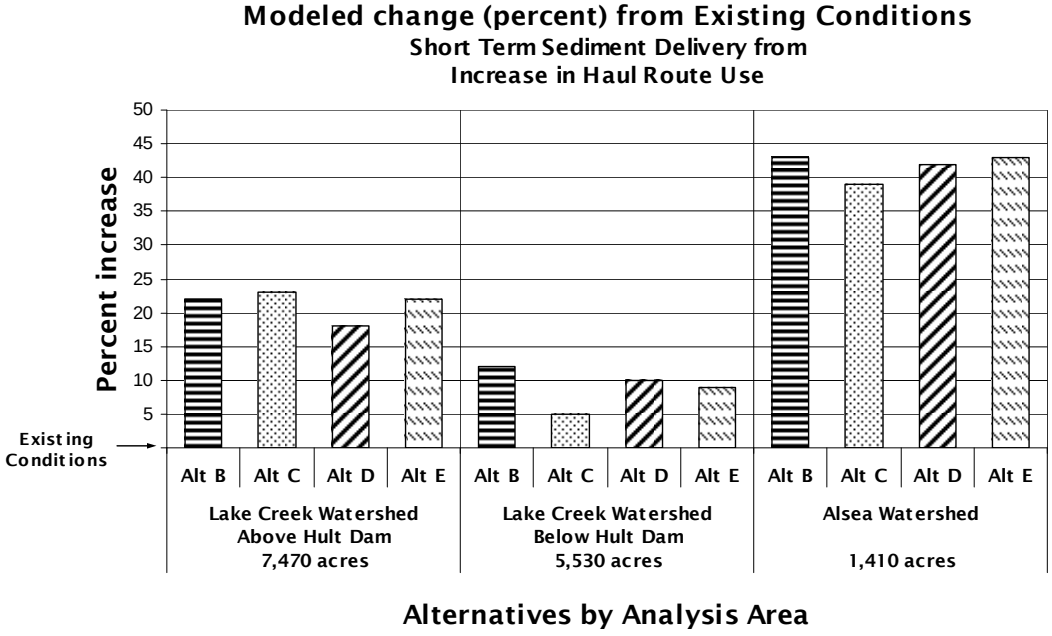
The risk of sedimentation from yarding would be low due to design features and the no-treatment buffers around all streams. Alternatives B, C, and D would maintain 100-foot buffers, and under Alternative E, the 25-foot minimum buffers would be evaluated on a site-specific basis and adjusted as necessary to minimize sedimentation risk.

Increased road use for timber haul and associated activities would cause road surface erosion and most of the short-term increases in sediment. Road surface erosion from haul was estimated from field observations and a modified version of the road surface model from the Washington Standard Methodology for Conducting Watershed Analysis (Washington Forest Practices Board, 1997). The methodology used for this analysis was also used in the Upper Siuslaw Late-Successional Reserve Restoration Plan (USDI-BLM 2003) and is described in more detail in that document. This model was used to determine the relative differences in delivery between alternatives and to highlight the areas of greatest sediment production.

The data collected for the road analysis is high quality and includes information on the entire proposed haul route and a very high percentage of all the roads in the planning area. The results of the modeling should be viewed with caution, however. The results are an approximation because of the limitations of the model and the many simplifying assumptions that were made to analyze road use at a landscape scale with a multi-year project.

Graph 1 shows the modeled comparison of short-term increases in sediment delivery from haul between existing conditions and the action alternatives, measured in percent change. The base line represents existing conditions; increased percent changes are on a year-to-year basis and do not show a total difference in sediment delivery. The model assumes that improvements to the transportation system (culvert replacement, cross drain installation, and road paving) are complete prior to hauling.

Graph 1. ***Modeled sediment increase***



Actual increases in sedimentation from haul would be lower than the model predicts for the following reasons:

- Predicted change was based on the simplifying assumption that all haul roads would have increased use simultaneously. In reality, due to the project length, many of the secondary roads and some main line roads would only be used for a short time frame (1-3 years). Simultaneous use of all, or even most roads, is highly unlikely.
- The model has a small number of traffic use categories. All main line roads were analyzed in the highest use category for the duration of the project to simplify the calculations. All secondary roads were analyzed in the second highest traffic use category. The increase in use of main line and secondary roads is likely to be more sporadic than could be modeled. The actual difference in sedimentation between current use and predicted use under this alternative would likely by smaller than predicted by the model.
- The traffic factors in the model did not separate out summer and winter haul; therefore it is assumed that winter haul rates are factored into the model. Winter haul can cause rutting of the road tread and "pumping of

interstitial sediment upward by compaction of gravels in the saturated road prisms" (Reid, 1981). These factors along with precipitation are assumed to be important in increasing sedimentation from road treadways (Reid, 1981; Bilby et al., 1989; Kahklen, 1993; Coker et al, 1993; and Burroughs and King, 1989). Limiting winter season haul to roads with little or no sediment delivery potential would result in a smaller increase in sedimentation than indicated by the model.

- Upgrading all secondary gravel roads to have a surfacing depth of 6 to 10 inches would also reduce the level of increase from that modeled for this analysis. About one-half of the secondary roads were modeled with surfacing depth of less than 6 inches. A surfacing depth greater than 6 inches significantly reduces erosion from road treadways (Swift, 1984).

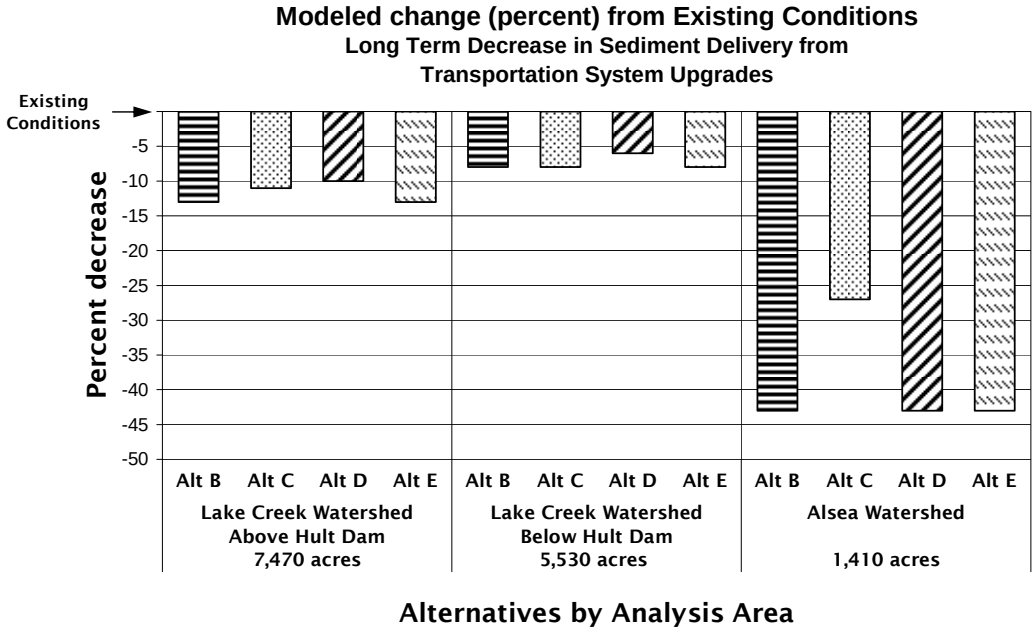
There would be some restoration to the sediment regime under all action alternatives from upgrading the transportation system. Removing old, undersized culverts and replacing them with larger culverts would reduce the amount of chronic erosion and the risk of catastrophic failure of thousands of cubic yards of fill at these sites. Some known sites on existing roads where temporary culverts would be needed currently have erosion and direct sediment input caused by streams flowing over the road surface. These sites would be decommissioned after use, reducing sediment delivery in the long term.

Installing cross drains would improve drainage from roads and reduce the delivery of flow and sediment to existing crossings. The risk of crossing failures and landslides, which could add hundreds to thousands of cubic yards of material to streams, would be lowered.

Paving four miles of the main line haul road, analyzed under EA-OR090-02-07, would have a long-term benefit in reducing sediment delivery (see Appendix B).

Graph 2 shows the modeled decrease in long-term sediment delivery after project completion.

Graph 2. ***Modeled sediment decrease***



Analysis:

Under Alternative A, the sediment regime would be **maintained** in the short term. There would be no increase in road use from haul, and no associated short-term increases in sedimentation in the 1 to 10 year time span of the proposed project. The road segments that currently deliver sediment would continue to deliver at the existing rate, which is dependent on future use from other activities that occur in the planning area. There would be no direct, short-term sediment pulses from removing and replacing stream crossing culverts, installing temporary culverts, or renovating roads. There would be no added risk of fill failure from having temporary culverts in place.

In the long term (post-project), the risk of culvert failure and chronic or catastrophic sedimentation would be higher than under the action alternatives because old and undersized pipes would not be upgraded. There would be no benefits in reducing sediment delivery from adding cross drains, decommissioning roads, or paving four miles of road (see Appendix B).

Action Alternatives

Direct comparison among Alternatives B, C, D and E of effects to the sediment regime is difficult. Design features vary the volume, locations, and yarding methods of proposed timber harvest, and limit sediment-causing activities in different portions of the Lake Creek Watershed. Qualitative analysis does not necessarily correlate to the quantative differences.

Short-term sediment increases from activities associated with removing and replacing stream crossing culverts, adding temporary culverts, installing cross drains, yarding, road renovation, construction or decommissioning would have minor effect on total sediment due to mitigation measure, quantities, and proximity to streams. Timber haul would contribute to the majority of short-term sediment increases (see Graph 1).

In the Lake Creek Watershed above Hult Dam, Alternatives B, C and E are similar and would result in similar short-term sediment increases. Alternative D, which is designed to minimize the short-term impacts of sediment delivery, would use fewer roads, so the increase in short-term sediment would be lower.

In the Lake Creek Watershed below Hult Dam, Alternative D and E would result in similar increases. Alternative B would use more number of roads miles and have a slightly greater increase. Under Alternative C, less volume would be harvested and fewer road miles would be used, so the increase in short-term sediment would be lower.

In the Alsea Watershed, harvest volume and road use proposals under Alternatives B, D, and E are similar and would result in similar effects. Under Alternative C, less volume would be harvested and fewer road miles would be used, so the increase in short-term sediment would be lower.

Long-term sediment reduction (post-project, see Graph 2) would correlate to the number of road miles upgraded during the project. Upgrades to the existing transportation system would result in less long-term sediment reduction.

Under Alternative A, there would be no upgrades to the transportation system, and no long-term reduction of sediment production. As existing culverts continue to age, the risk of catastrophic failure of culverts would increase.

Alternatives B, C, D and E would result in long-term reduction of sediment. The risk of catastrophic culvert failure would be decreased. Alternatives C and D would have less long-term sediment reduction because of the lower level of transportation system upgrades.

ACS OBJECTIVE 8 – *Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distribution of coarse woody debris sufficient to sustain physical complexity and stability.*

Measures: Structural diversity maintained, enhanced, or restored by considering the following factors:

Table 7. *Issue 2, ASC 8*

	Results by Alternative				
	A	B	C	D	E
• number of acres of Riparian Reserves treated to accelerate late-successional characteristics	0	1,600	929	1,620	2,200

Analysis:

Under Alternative A, none of the Riparian Reserves would be treated. Species composition and structural diversity of riparian plant communities would be **maintained** at current levels. Stand conditions would degrade in the long term as they continue on current trajectories with increasing susceptibility to windthrow, disease and fire. This alternative would be the slowest to attain physical complexity and stability due to slower growth under high-density conditions. Creation of snags and downed wood within Riparian Reserves would be slower than any of the action alternatives, since these would be limited to catastrophic occurrences.

Under Alternative B, species composition and structural diversity of riparian plant communities would be **restored** on the treated acres. This alternative would enhance physical complexity and stability by implementing a moderate thinning prescription uniformly across the landscape in all Riparian Reserves. Structural complexity across the landscape would occur only as facilitated by natural disturbance events. Creation of snags and downed wood would occur only as by-products of logging or by catastrophic occurrences and would be slower than Alternatives C and D. Under Alternative B, large conifers would develop more slowly in Riparian Reserves than under Alternatives C and D.

Under Alternative C, species composition and structural diversity of riparian plant communities would be **restored** on the treated acres. Moderately heavy and heavy thinning in riparian stands would increase structural complexity more quickly than other action alternatives. Thinning prescriptions would be designed to enhance connectivity of late-successional habitat across the landscape. Accelerating development of late-successional characteristics would also enhance long-term recruitment potential for large wood into streams. The addition of coarse woody debris in the form of downed wood (4 TPA) and snags (4 TPA) would increase habitat complexity to a greater degree than Alternatives B and E.

Under Alternative D, species composition and structural diversity of riparian plant communities would be **restored** on the treated acres. Moderate thinning on 80% of the treated riparian stands would enhance physical complexity and stability across the landscape. Heavy thinning would occur on 20% of the riparian stands (approximately 300 acres) to increase structural complexity more quickly in portions of the planning area. Heavy thinning would further accelerate development of late-successional characteristics, improving spotted owl habitat and enhancing long-term recruitment potential for large wood into streams. This would occur more quickly than under moderate thinning prescribed under

Alternatives B and E, but more slowly than Alternative C. The addition of coarse woody debris in the form of downed wood (4 TPA) and snags (4 TPA) would increase habitat complexity to a greater degree than Alternatives B and E.

Under Alternative E, species composition and structural diversity of riparian plant communities would be **restored** on the treated acres. Similar to Alternative B, this alternative would enhance physical complexity and stability by implementing a moderate thinning prescription uniformly across the landscape in Riparian Reserves (2,200 acres). However, large conifers in Riparian Reserves would develop more slowly than under Alternatives C and D.

In-stream structural complexity would improve under Alternative E. Creation of downed wood in streams would improve stream habitat diversity by decreasing water velocity, promoting pool development, trapping spawning gravel, and creating off-channel habitat.

ISSUE 3. What are the effects of timber harvest and associated activities to northern spotted owl foraging habitat within the home range of active owl sites?

Measures: Percent of foraging habitat remaining intact within the two active spotted owl home ranges.

Under Alternative A, no thinning would occur under this EA and there would be no effects to foraging habitat quality or quantity for the two active owl sites within the planning area. Beyond 20 years, it is likely that some portion of the planning area may undergo a regeneration harvest that would reduce the amount of foraging habitat. The rest of the stands would continue to grow in an overstocked condition and tree growth would slow over time. There would be a benefit of small snags and downed wood that would be created through suppression mortality. If no natural disturbances occurred to open up the stand, there would be less food for small mammal species and some populations may decline (Suzuki and Hayes, 2003).

Under Alternative B, thinning would occur within the home range of the two active owl sites. The amount of intact foraging habitat available within the two owl home ranges would be reduced below the 40% habitat threshold (1,906 acres; see Table 8). Thinning would reduce canopy cover and disturb the forest floor. As a result, the existing spotted owls would be more vulnerable to predation and populations of their prime prey species (flying squirrels, red tree voles, and red-backed voles) may diminish for 10-20 years, potentially decreasing the owls' survival.

Table 8. ***Issue 3, Alt B***

Owl Site	Total foraging habitat within the home range	Alternative B treatment acres	Intact foraging habitat remaining
Horton	1,836 ac (38%)	710 ac	1,126 ac (24%)
Alsea River	2,420 ac (51%)	830 ac	1,590 ac (33%)

Beyond 10-20 years, foraging habitat would probably improve. However, owls have been observed to avoid recently thinned stands within their home range (Meiman et al. 2003). Improved conditions would occur after the lifespan of the existing owl pair; occupation of these sites by another owl pair in the future cannot be predicted.

This action *may affect and is likely to adversely affect* the two owl sites.

Under Alternative C, thinning would occur within the home range of the Alsea River owl site. Thinning would reduce canopy cover and disturb the forest floor. As a result, spotted owls would be more vulnerable to predation and populations of their prime prey species (flying squirrels, red tree voles, and red-backed voles) may diminish for 10-20 years. Although thinning within the home range of the Alsea River owl site would impact foraging habitat in the short term, available foraging habitat would remain above the 40% habitat threshold. No thinning of foraging habitat would occur within the home range of the Horton owl site because the amount of intact nesting, roosting and foraging habitat is currently below the 40% habitat threshold (1,906 acres).

Table 9. ***Issue 3, Alt C***

Owl Site	Total foraging habitat within the home range	Alternative C treatment acres	Intact foraging habitat remaining
Horton	1,836 ac (38%)	0 ac	1,836 ac (38%)
Alsea River	2,420 ac (51%)	200 ac	2,220 ac (46%)

Beyond 10-20 years, the thinned foraging habitat within the Alsea River owl home range would probably improve. However, owls have been observed to avoid recently thinned stands within their home range (Anthony et al. 2001). Improved conditions would occur after the lifespan of the existing owl pair; occupation of these sites by another owl pair in the future cannot be predicted.

This action *may affect but is not likely to adversely affect* the two owl sites.

Under Alternative D, thinning would occur within the home range of the two active owl sites. The amount of intact foraging habitat available within the two owl home ranges would be reduced below the 40% habitat threshold (1,906 acres). Thinning would reduce canopy cover and disturb the forest floor. As a result, the existing spotted owls would be more vulnerable to predation and populations of their prime prey species (flying squirrels, red tree voles, and red-backed voles) may diminish for 10-20 years, potentially decreasing the owls' survival.

Table 10. ***Issue 3, Alt D***

Owl Site	Total foraging habitat within the home range	Alternative D treatment acres	Intact foraging habitat remaining
Horton	1,836 ac (38%)	710 ac	1,126 ac (24%)
Alsea River	2,420 ac (51%)	830 ac	1,590 ac (33%)

Beyond 10-20 years, foraging habitat would probably improve. However, owls have been observed to avoid recently thinned stands within their home range (Anthony et al. 2001). Improved conditions would occur after the lifespan of the existing owl pair; occupation of these sites by another owl pair in the future cannot be predicted.

This action *may affect and is likely to adversely affect* the two owl sites.

Under Alternative E, thinning would occur within the home range of the two active owl sites. The amount of intact foraging habitat available within the two owl home ranges would be reduced below the 40% habitat threshold (1,906 acres). Thinning would reduce canopy cover and disturb the forest floor. As a result, the existing spotted owls would be more vulnerable to predation and populations of their prime prey species (flying squirrels, red tree voles, and red-backed voles) may diminish for 10-20 years potentially decreasing the owls' survival.

Table 11. ***Issue 3, Alt E***

Owl Site	Total foraging habitat within the home range	Alternative E treatment acres	Intact foraging habitat remaining
Horton	1,836 ac (38%)	710 ac	1,126 ac (24%)
Alsea River	2,420 ac (51%)	830 ac	1,590 ac (33%)

Beyond 10-20 years, foraging habitat would probably improve. However, owls have been observed to avoid recently thinned stands within their home range (Anthony et al. 2001). Improved conditions would occur after the lifespan of the existing owl pair; occupation of these sites by another owl pair in the future cannot be predicted.

The action *may affect and is likely to adversely affect* the two owl sites.

ISSUE 4. What are the effects of timber harvest and associated activities to northern spotted owl dispersal habitat within the project area?

Measures: Percent of treated acres within the project area with dispersal habitat degraded or removed (treated acres divided by acres of planning area).

Under Alternative A, there would be no thinning and no effects to spotted owl dispersal habitat (a total of 9,300 acres) in the next 10 years. In 20–30 years, the stands would either undergo a regeneration harvest, in which case dispersal habitat would be removed, or the stands would continue to grow in an overstocked condition and tree growth would slow over time. Suppressed mortality and windthrow of trees would increase as competition for growing space increases. Succession would occur much slower under uniform, dense stand conditions and the benefit of increased tree growth would be lost. There would be a benefit of small snags and downed wood that would be created, but there would be less food for small mammal species and some populations may decline (Suzuki and Hayes, 2003).

Within the Riparian Reserves, the long-term development of mature and late-successional forests and their associated species would occur more slowly through natural disturbances and forest succession. A persistent closed canopy would slow the growth of understory hemlock, and red cedar regeneration and slow development of canopy layering. Herbs, shrubs, and non-vascular plants would remain undisturbed.

Under Alternative B, 4,900 acres (38%) of dispersal habitat in the planning area would be temporarily degraded as a result of thinning. For 10-20 years post-harvest canopy closure would be reduced, but would remain above 40% and stands would still function as dispersal habitat. As a result of opening of the canopy and disturbance to the understory, spotted owls would be more vulnerable to predation, and populations of their primary prey species (flying squirrels, red tree voles and red-backed voles) may be reduced. Over the next 20–30 years, structural development in the stand (larger diameter trees and a more developed midstory and understory) would benefit small mammal populations and result in improved dispersal habitat for owls (Suzuki and Hayes, 2003). In the same time frame, upland stands may undergo a regeneration harvest in which case dispersal habitat would be removed. However, it is more likely that regeneration harvest would occur over the course of several decades, so some higher quality dispersal habitat in the planning area would remain. Coarse woody debris would still be sparse and would not have as ready a source of input as in Alternative A due to a lack of suppression mortality.

Under Alternative C, 2,600 (36%) of dispersal habitat in the planning area would be temporarily degraded as a result of thinning. For up to 10-20 years post-harvest in the moderately thinned stands, 20-30 years in the moderately heavy thinned stands, and over 30 years in the heavily thinned stands, canopy closure would be reduced. In the moderately thinned stands and moderately heavily thinned stands, canopy closure would remain above 40% and stands would still function as dispersal habitat. Heavy thinning in a small portion of the Riparian Reserves would remove 3% of dispersal habitat in the planning area. During the above time periods, spotted owls would be more vulnerable to predation, and populations of their primary prey species (flying squirrels, red tree voles and red-backed voles) may be reduced. Treatments that involve moderately heavy and heavy thinning prescriptions would have greater and longer effects on spotted owl vulnerability and prey species than moderate thinning. However, unlike the other action alternatives, a sufficient quantity of un-treated stands would remain throughout the project area to provide refugia for the dispersing owls and the small mammals.

Moderately-heavy thinning in two "corridors" (1,700 acres) would improve owl habitat by further accelerating structural development of the forest stands and enhancing connectivity of late-successional habitat within the planning area. After 30 years, those stands treated with moderately heavy and heavy thins would have trees with fuller crowns and have even greater development and complexity of the midstory and understory than those treated with moderate thins. The increased structural development of the stands would benefit small mammal populations and result in improved dispersal habitat for owls (Suzuki and Hayes, 2003). Rather than just passing through, owls would be able to live in the dispersal habitat for several months.

If the stands are given time to mature, the resulting stands would provide spotted owls with the ability to nest, roost, and forage. In the same time frame,upland stands may undergo a regeneration harvest in which case dispersal habitat would be removed. However, it is more likely that regeneration harvest would occur over the course of several decades, so some higher quality dispersal habitat in the planning area would remain. The addition of coarse woody debris under this alternative would further increase the complexity and stability of the forest ecosystem and support the development of complex small mammal communities (Carey and Harrington, 2001).

Under Alternative D, 4,600 acres (36%) of dispersal habitat in the planning area would be temporarily degraded as a result of thinning. For 10-20 years post-harvest canopy closure would be reduced, but would remain above 40% and stands would still function as dispersal habitat. Heavy thinning on 320 acres (2% of dispersal habitat in the planning area) in the Riparian Reserves would remove dispersal habitat for approximately 10 years and reduce canopy closure for over 30 years. During this time period, spotted owls would be more vulnerable to predation and populations of their primary prey species (flying squirrels, red tree voles and red-backed voles) may be reduced. Over several decades, structural development of the stand (larger diameter trees and a more developed midstory and understory) would benefit small mammal populations and result in improved dispersal habitat for owls (Suzuki and Hayes, 2003). In the same time frame upland stands may undergo a regeneration harvest in which case dispersal habitat would be removed. However, it is more likely that regeneration harvest would occur over the course of several decades, so some higher quality dispersal habitat in the planning area would remain. The addition of coarse woody debris under this alternative would further increase the complexity and stability of the forest ecosystem and support the development of complex small mammal communities (Carey and Harrington, 2001).

Under Alternative E, 5,000 acres (39%) of dispersal habitat in the planning area would be temporarily degraded as a result of thinning. For 10-20 years post-harvest canopy closure would be reduced, but would remain above 40% and stands would still function as dispersal habitat. During this time frame, spotted owls would be more vulnerable to predation and populations of their primary prey species (flying squirrels, red tree voles and red-backed voles) may be reduced. In the next 20–30 years, structural development in the stand (larger diameter trees and a more developed midstory and understory) would benefit small mammal populations and result in improved dispersal habitat for owls (Suzuki and Hayes, 2003). In the same time frame, upland stands may undergo a regeneration harvest, in which case dispersal habitat would be removed. However, it is more likely that regeneration harvest would occur over the course of several decades, so some higher quality dispersal habitat in the planning area would remain. Coarse woody debris would still be sparse outside of the Riparian Reserves and would be similar to Alternative B due to a lack of suppression mortality.

ISSUE 5. What are the effects of timber harvest and associated activities on the productivity of harvestable mushrooms?

Measures: Percent of full mushroom productivity in the Matrix portion of the planning area and within timber harvest units compared to existing condition.

Preliminary data from studies on the effects of thinning to chanterelles in the Willamette and Gifford Pinchot National Forests (Pilz et al., 2003, and David Pilz, unpublished data) suggests a nearly 1:1 relationship between number of trees removed and loss of chanterelles, particularly when averaged over a large area and multiple years. Chanterelle fruiting depression after timber harvest is likely a result of the loss of mycorrhizal host trees, and hence carbohydrate source, although a warmer, drier microclimate, and soil disturbance and compaction may also contribute (Pilz et al., 2003). In addition, slash left after timber harvest, and increased brush growth can decrease local productivity and increase the difficulty in finding mushrooms.

Data from a study conducted on the Olympic Peninsula suggests chanterelle productivity increases on average with stand age from 20 to 100 years of age (Pilz et al.1998). Mushroom harvesters generally characterize second growth forests as good habitat for mushrooms, while clearcuts and young forest are considered poor areas to find mushrooms. Opinions are split regarding old growth (Love et al. 1998).

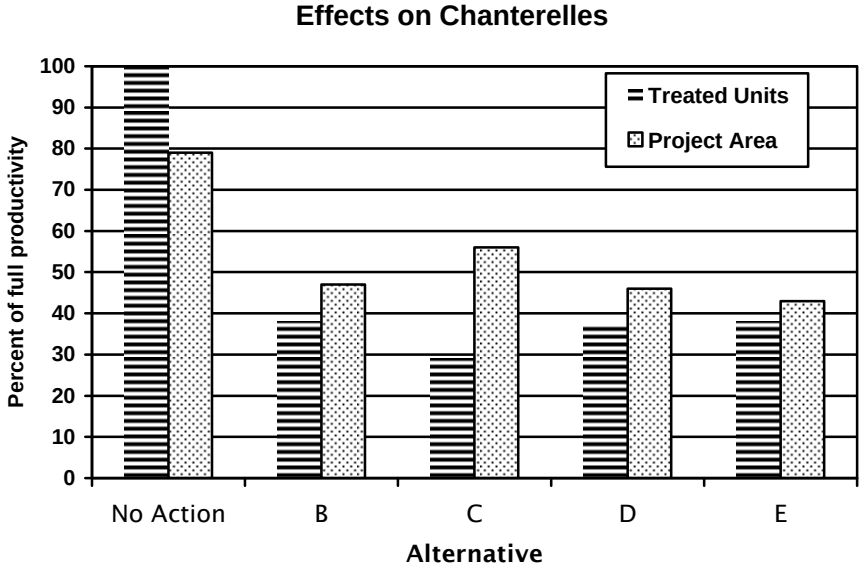
Effects to harvestable mushrooms for this document were analyzed at two levels: the harvest area and the "project area". The project area was defined as the planning area minus the LSR sections. Analysis of the project area as opposed to the entire planning area was important because it focuses on the effects to the areas proposed for thinning, and the areas that are most productive and popular for mushroom harvesting (sections 12, 13, 14, 15, 16, and 24).

Mushroom productivity was calculated using stand age and trees per acre removed in recent or proposed thinning. Non-forested areas were removed from the analysis. For calculation purposes, stands not recently thinned were assumed at 100% productivity, and stands under 40 years old were assumed to be at 0%. Recently thinned areas (Hult View, Little Al, and Ten High Timber Sales) were estimated at 42% of full productivity. Productivity within the project area was considered to be 79% of full productivity due to previous timber harvests (thinnings and clearcuts) (see Graph 3).

Mushroom production recovery in thinned stands is estimated to occur within 10-20 years, at a recovery rate of approximately 4% per year. Recovery in thinned

stands is hypothesized to occur when canopy cover and photosynthate production returns to original levels. No empirical data exists for recovery in thinned stands, except a study showing a small recovery after 7 years that was not statistically significant (David Pilz, personal communication). Based on the above assumptions, in the long term (beyond 10-20 years) all alternatives are expected to have similar mushroom productivity.

Graph 3. ***Issue 5, Effects on Chanterelles***



The project area is currently at 79% of potential productivity. Under **Alternative A**, there would be no effects to mushroom productivity from thinning. Productivity would increase over time as stands recover from recent thinning and as young stands mature.

Under **Alternative B**, thinning would result in an estimated 47% of potential mushroom productivity in the project area, and an estimated 38% within the thinned areas of the project. Productivity would increase over time as stands recover from recent thinning and as young stands mature.

Moderately heavy thinning under **Alternative C** would result in an estimated 56% of potential productivity within the project area and 29% within the thinned areas in the project area. Productivity of mushrooms within the project area would be less affected than under Alternative B, due to the harvest deferrals of mushroom areas. Deferrals are primarily areas on south slopes and ridges, areas where *Allotropa virgata* is found, and where most mushroom harvesting on the District occurs. These deferral areas would retain productive areas for mushroom harvesting while adjacent thinned areas are recovering. Productivity would increase over time as stands recover from recent thinning and as young stands mature.

Under **Alternative D**, thinning would result in an estimated 46% of potential productivity in the project area and 37% in the thinned area. The use of helicopter logging on 1050 acres would result in less impact to mushroom productivity due to fewer acres of soil disturbance and soil compaction which reduces fruiting (David Pilz, personal communication). Otherwise, Alternative D is similar in effects

to Alternative B. Productivity would increase over time as stands recover from recent thinning and as young stands mature.

Alternative E would result in an estimated 43% of potential mushroom productivity in the project area, and an estimated 38% within areas proposed for thinning. This is a larger reduction in productivity than the other alternatives due to the greater number of acres treated. Productivity would increase over time as stands recover from recent thinning and as young stands mature.

ISSUE 6: What are the effects of timber harvest and associated activities on the spread of invasive non-native and noxious weeds?

Measures: Increased risk of weed invasion by considering acres of ground disturbance from thinning, road work, and landings.

It is estimated that thinning would result in 1-2% cover of weeds within harvest units and an estimated 5% cover along new and renovated roads due to ground disturbance and decreased canopy cover. Currently, weed cover is approximately 1-5% in the Ten High timber sale (harvested in 2001) and approximately 1% in stands thinned ten years ago. The alternatives will differ primarily in the number of acres of timber harvest, road renovation, and road building, (e.g., areas which provide opportunities for weed invasions). Potential weed cover is difficult to predict due to vagaries of seed dispersal and establishment. However, resulting weed infestations are expected to be fewer in harvest units that would be aerially yarded, due to less spread of weed seed by logging equipment. Likewise, weed infestations would be greater in units that are heavily thinned, due to increased light and ground scarification. Increased weed infestation in response to proposed harvest and road construction/renovation is expected to persist for 10-25 years. Thysell and Carey (2001) found 10% exotic cover one year after harvest, while Muir et al (2002) found 0.1-0.3% exotic species cover in stands in western Oregon measured 10-25 years after thinning (Muir et al., 2002).

Existing weed cover was estimated by considering the current area of roads, recently thinned units, and young (10-15 year old) plantations. The existing weed cover was estimated to be 5% on roads, 1.5% in recently thinned units, and 2% in young plantations. There are an estimated 20 acres of weed cover over existing roads, thinned areas, and young plantations in the project area. Road-side weed surveys in 2003 provide an alternate estimate of current cover. Each tenth of a mile was scored as low (<100 plants), moderate (100-1,000 plants) or high (>1,000 plants) for each weed species. These surveys included Oregon Department of Agriculture listed noxious weeds, and several unlisted non-native weeds as well. By assuming 1 square foot for each herbaceous weed, and 5 square feet for each shrub, weed coverage was estimated at 27 acres.

The potential increase in acres of weeds was calculated for each of the action alternatives. The acres of disturbance were multiplied by percent weed cover, resulting in an estimated acreage of weed cover. Post-harvest weed cover is estimated at 5% for new and renovated roads, 1.5% within moderately thinned units, 2% in heavily thinned units, 1% in helicopter units, and 1.5% in heavily thinned helicopter units. These amounts were added to estimates of existing weed cover.

Alternative A would not add to existing weed cover or rates of spread. There would be continued spread of noxious weeds along existing, open roads, but also a greater decrease in weeds within recent harvest units as tree and shrub canopy cover increases. False brome is an exception. Although it seems to require disturbance to invade most plant communities, it is fairly shade tolerant and therefore can persist even under closed canopy forest.

Alternative B is estimated to lead to higher weed cover than current conditions, due to the extensive area of disturbance. Alternative B has a higher risk for spreading false brome than under Alternatives A or C. Under Alternative B, road renovation would occur within existing false brome populations, and three possible new road segments would originate from areas of false brome populations. Alternative B would also include thinning adjacent to about one mile of false brome infested roadsides compared to thinning adjacent to 600 feet of false brome under Alternative C.

Alternative C would have the smallest increase in weeds of all the action alternatives, due to the smaller number of acres disturbed. However, heavier thinning in some areas could result in a higher amount of weed cover than what would be estimated based on acreage alone. Alternative C has the least amount of risk for spread of false brome, as this alternative minimizes road building and thinning in the vicinity of false brome populations.

Alternative D is similar to Alternative B, although less weed coverage is predicted, due to the larger amount of helicopter logging. This alternative has a higher risk for spreading false brome than Alternative A or C. This is due to probable road renovation and use of road segments within existing false brome populations, and thinning of units adjacent to about one mile of false brome-infested roadsides.

Alternative E would lead to the greatest weed cover based on the higher number of acres that are disturbed. Similar to B and D, this alternative has a higher risk for spreading false brome than Alternative A or C.

ISSUE 7. What are the effects of alternative design features on the cost of yarding, road construction and road renovation?

Measures: Cost per acre and cost per thousand board feet (MBF).

Each of the action alternatives proposes a different combination of logging systems. Logging system selection was determined on the basis of percent slope. Those areas less than 35% were considered suitable for ground-based yarding, and those greater than 35% would require cable yarding. Next, access to potential harvest areas was considered. Some access limitations may preclude conventional logging systems and require aerial logging. Other logging system constraints may result from winter haul restrictions, difficult stream crossings, and inaccessibility by conventional road construction and/or renovation.

For each of the action alternatives, different constraints resulted in different acreages by logging system. Existing Geographical Information System (GIS) information was used to estimate the acres per logging system for each alternative, as shown in Table 12.

Table 12. ***Approximate Acreage by Logging System***

Logging System	Acres by Alternative				
	A	B	C	D	E
Aerial	0	70	20	1,050	120
Cable	0	2,940	1,960	2,430	3,470
Ground	0	1,890	1,120	1,420	1,910

To estimate harvest volumes per logging system, 14 thousand board feet (MBF) per acre was used for Alternatives B, D, and E, and 16 MBF/acre was used for Alternative C (Table 13). The prescription for Alternative C would include medium-heavy and heavy thinning, which would result in a higher volume per acre.

Table 13. ***Approximate Volume by Logging System***

Logging System	Volume by Alternative				
	A	B	C	D	E
Aerial	0	980	290	14,640	1,720
Cable	0	41,200	31,440	34,100	48,500
Ground	0	26,420	17,870	19,850	26,780

Using the Helipace program, helicopter logging is estimated to cost approximately $380/MBF for a partial harvest. This cost is for falling and yarding only.

To estimate the cost of cable and ground-based logging per MBF, the average appraised cost of logging systems for two recent partial harvest projects (Hult View, Little Al) in the planning area was used. The average cable logging cost on the two projects was $175/MBF, and the average ground-based logging cost was $75/MBF. These costs are for falling and yarding only.

To estimate road construction/renovation costs, one mile of new road construction and one mile of road renovation were calculated using the current BLM road appraisal system. The resulting estimated costs per mile are $11,000 for construction and $3,900 for renovation.

The estimated costs of yarding and roading were added together for each alternative. Each total was divided by its respective acreage and volume to derive the cost per acre and the cost per MBF.

Table 14. ***Logging Costs***

Logging System	Costs by Alternative				
	A	B	C	D	E
Per acre	0	$2,004	$2,289	$2,688	$2,067
Per MBF	0	$143	$143	$192	$148

The costs associated with Alternative D would be greater the other action alternatives because more acres would be aerially logged. Due to the competition for helicopter resources at wildfires, the cost of aerially logging during the summer may increase beyond what is shown here.

CONSULTATION AND COORDINATION

LIST OF PREPARERS

The Proposed Action and alternatives were developed and analyzed by the following interdisciplinary team of BLM specialists.

NAME	TITLE	DISCIPLINE
Steve Steiner	Forest Hydrologist	Soils/Hydrology
Mark Stephen	Forest Ecologist	Ecology
Jeff Apel	Engineer	Roads/Transportation
Shamila Premdas	Aquatic Ecology SCEP	Aquatic Ecology
Carla Alford	Wildlife Biologist	EA Writer/Editor
Peter O'Toole	Silviculturist/Timber Planner	Silviculture
Alison Center	T & E and Wildlife Biologist	Wildlife Habitat
Leo Poole	Fisheries Biologist	Fisheries
Doug Goldenberg	Botanist	Botanical Resources
Janet Zentner	Forester	Logging Systems
Rick Colvin	Landscape Planner	Planning and Environmental Coordination

CONSULTATION

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA FISHERIES)

ESA Consultation

BLM will conduct Individual project-level consultation with NOAA Fisheries on those actions that may affect coho salmon.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires Federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) under the Act. The proposed alternatives, as described and analyzed in this environmental assessment would have "No Effect" on waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

U.S. FISH AND WILDLIFE SERVICE (USFWS)

ESA Consultation

Consultation with the USFWS is required for the Proposed Action. Consultation will be initiated and completed prior to making a final decision for this action.

CONFEDERATED TRIBES OF THE COOS, LOWER UMPQUA, AND SIUSLAW INDIANS

The Bureau of Land Management Siuslaw Resource Area consulted with the Confederated Tribes of Siletz, and the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians. No response was received.

PUBLIC PARTICIPATION

Scoping

On August 18, 2003, a scoping letter was mailed to over 300 groups, businesses, local government agencies, and individuals, announcing that BLM was seeking help identifying issues and concerns regarding timber harvest in the North Lake Creek area. An open house was held on September 4, 2003, at the Triangle Grange. In addition, BLM staff was available during the Blachly Fair, September 7-8, 2003, to discuss people's ideas and concerns regarding timber management in the planning area. Approximately 16 responses were received. Comments were generally in support of thinning forested stands, protecting mushroom collecting areas, and concerns regarding fish habitat, water quality, and motorized recreation opportunities.

EA Review

A public notice advertising the availability of this EA and preliminary FONSI will be published in the Eugene Register-Guard on May 26, 2004. The EA will be sent to 12 groups or businesses, 9 state or local government agencies, and 15 individuals. In addition, a notice announcing the availability of the EA will be sent to approximately 90 individuals, who had received a commercial mushroom harvesting permit for the planning area since October, 2003. A 30-day public comment period for the EA closes on June 25, 2004.

REFERENCES

Beechie, T.J., and T.H. Sibley. 1997. Relationships between channel characteristics, woody debris and fish habitat in northwestern Washington streams. Transactions of the American Fisheries Society 126: 217-229.

Bilby, R.E., K. Sullivan, and S.H. Duncan, 1989. The generation and fate of road-surface sediment in forested watersheds in southwestern Washington. Forest Science, 35(2), 453-468.

Burroughs, E.R.J., and J.G. King, 1989. Reduction of soil erosion on forest roads. USDA Forest Service (General Technical Report INT-264).

Carey, A.B., and Harrington, C.A. 2001. Small mammals in young forests: Implications for management for sustainability. Forest Ecology and Management 154(1-2): 289-309.

Cederholm, J.C., et. al. 1997. Response of juvenile coho salmon and steelhead to placement of large woody debris in a coastal Washington stream. North American Journal of Fisheries Management 17: 947-963.

Coker, R.J., B.D. Fahey, and J.J. Payne, 1993. Fine sediment production from truck traffic, Queen Charlotte Forest, Marlborough Sounds, New Zealand. Journal of Hydrology (N.Z.), 31(1), 56-64.

Council on Environmental Quality. 1997. Environmental Justice Guidance under the National Environmental Policy Act. Washington, D.C. Available on-line at: http://ceq.eh.doe.gov/nepa/regs/ej/justice.pdf.

Curtis, R. O. 1982. A simple index of stand density for Douglas-fir. Forest Science 28 (1): 92-94.

Forsman, E. D., R. G. Anthony, J. A. Reid, P. J. Loschl, S. G. Sovern, M. Taylor, B. L. Biswell, A. Ellingson, E. C. Meslow, G. S. Miller, K. A. Swindle, J. A. Thrailkill, F. F. Wagner, and D. E. Seaman. 2002. Natal and breeding dispersal of northern spotted owls. Wildlife Mongraphs. No. 149. 35 pages.

Gomez, D.M., and Anthony, R.G. 1996. Amphibian and Reptile Abundance in Riparian and Upslope Areas of Five Forest Types in Western Oregon. Northwest Science, Vol. 70, No. 2.

Kahklen, K.F., 1993. Surface erosion from a forest road, Polk Inlet, Prince of Wales Island, Alaska. Master's Thesis, Oregon State University.

Lisle, T.E. 1986. Stabilization of a gravel channel by large streamside obstructions and bedrock bends, Jacoby Creek, northwest California. Geological Society of America Bulletin 97: 999-1011.

Love, T., E. Jones, and L. Liegel. 1998. Valuing the temperate rainforest: wild mushrooming on the Olympic Peninsula Biosphere Reserve. In: Ambio Special Report #9, Royal Swedish Academy of Sciences.

Meiman, S., R. Anthony, E. Glenn, T. Bayless, A. Ellingson, M.C. Hansen, and C. Smith. 2003. Effects of commercial thinning on home-range and habitat-use patterns of a male spotted owl: a case study. Wildlife Society Bulletin. 2003. 31(4):1254-1262.

Montgomery, D.R., et.al. 1995. Pool spacing in forest channels. Water Resources Research 31: 1097-1105.

Muir, P.S., R.L. Mattingly, J.C. Tappeiner, J.D. Bailey, W.E. Elliot, J.C. Hagar, J.C. Miller, E.B. Peterson and E.E. Starkey. 2002. Managing for biodiversity in young Douglas-fir forests of western Oregon. USGS, Biological Resources Division, Biological Science Report USGS/BRD/BSR-2002-0006. 76 pp.

Nielsen, J.L., 1992. Microhabitat-specific foraging behavior, diet, and growth of juvenile coho salmon. Transactions of the American Fisheries Society. 121 : 617-634.

Pilz, D., R. Molina, and L. Liegel. 1998. Biological productivity of chanterelle mushrooms in and near the Olympic Peninsula Biosphere Reserve. In: Ambio Special Report #9, Royal Swedish Academy of Sciences.

Pilz, D., L. Norvell, E. Danell and R. Molina. 2003. Ecology and management of commercially harvested chanterelle mushrooms. Gen. Tech. Rep. PNW-GTR-576. Portland, OR: USDA-FS, Pacific Northwest Research Station. 83 pp.

Reid, L.M., 1981. Sediment production from gravel-surfaced roads, Clearwater Basin, Washington. University of Washington Fisheries Research Institute, Seattle (Publ. FRI-UW-8108).

Robison, E.G., Beschta, R.L. 1990. Characteristics of coarse woody debris for several coastal streams of southeast Alaska, U.S.A. Canadian Journal of Fisheries Aquatic Sciences. 47: 1684-1693.

Swift, L.W., Jr., 1984. Gravel and grass surfacing reduces soil loss from mountain roads. Forest Science, 30(3), 657-670.

Thysell, D.R. and A.B. Carey. 2001. Manipulation of density of Pseudotsuga menziesii canopies: preliminary effects on understory vegetation. Can. J. For. Res. 31: 1513-1525.

USDA, Forest Service and USDI, Bureau of Land Management. March 2004. Stream Sufficiency Analysis for Stream Temperature, Evaluation of the adequacy of the Northwest Forest Plan Riparian Reserves to achieve and maintain stream temperature water quality standards.

USDI-BLM. 1999. Environmental Justice Screening in NEPA Analysis for Oregon, Washington, and Northern California. Oregon/Washington State Office, Portland, Oregon.

USDI-BLM, 2003. Draft EIS- Upper Siuslaw Late-successional Reserve Restoration Plan.

Washington Forest Practices Board, 1997. Standard Methodology for Conducting Watershed Analysis. Version 4.0.

Wipfli, M.S. 1997. Terrestrial invertebrates as salmonid prey and nitrogen sources in streams: contrasting old-growth and young-growth riparian forests in Southeastern Alaska, U.S.A. Canadian Journal of Fisheries Aquatic Science. 54: 1259-1269.

APPENDIX A

DESIGN FEATURES FOR ACTION ALTERNATIVES – NORTH LAKE CREEK

The following general design features would be implemented in conjunction with the proposed action and other action alternatives. Project design features are operating procedures normally used to avoid or reduce adverse environmental impacts as developed by the interdisciplinary team, or are required standards and guidelines included in a timber sale contract.

General Design Features

1. All Pacific yew and hardwoods would be retained to the extent possible, to maintain diversity of tree species.
2. Un-merchantable tree tops and limbs would not be yarded to the landing and would be left on site to contribute to soil productivity.
3. Additional rock would be placed on existing rocked roads to a depth (6-inch minimum) suitable for timber haul.

Silvicultural Design Features

4. For the purpose of long-term productivity and maintenance of biological diversity, all down coarse woody debris of advanced decay (Decay Class 3, 4, or 5) would be retained on site.
5. To provide habitat for cavity dependent wildlife and to protect the future source of down logs, snags not posing a safety hazard would be reserved. Directional felling and yarding would be utilized to protect residual green trees and snags consistent with State safety practices. Snags felled as danger trees would be retained as downed wood.
6. Harvest activities would not occur during sap flow season (April 15-June 15) to limit bark/cambium damage to residual trees, unless waived by the Authorized Officer. Log lengths would be restricted to a maximum of 40 feet in order to protect residual trees during yarding, unless waived by the Authorized Officer.

Logging System Design Features

Cable Yarding (Upland and Riparian)

7. Helicopter Yarding would be used when access limitations preclude conventional logging systems. Access limitations may include, but are not limited to, seasonal concerns, stream crossings, and inaccessibility by conventional road construction and /or renovation due to topography or legal access constraints.
8. All cable yarding would be to designated or approved landings. Landings would be located to minimize impacts to reserve trees and soils.
9. Cable corridors would be kept approximately 150 feet apart on one end, where possible to minimize impacts to reserve trees, and would be limited to 12 feet in width. A cable system capable of lateral yarding 75 feet would be used.
10. A minimum of one-end suspension would be required when cable yarding. Intermediate supports could be necessary to achieve the required suspension.
11. Full-suspension of logs would be required when yarding logs across streams.

12. Skyline cable corridors may be required through Riparian Reserves, including untreated stream buffers, in order to gain additional lift or deflection of the skyline, and to attain the required suspension of logs during yarding. Intermediate supports or lift trees may be needed to attain the required suspension. Trees in the skyline cable corridors located within the untreated stream buffers would be felled, left parallel to the stream to the extent possible, and retained on-site to provide down wood.

13. Directional felling and yarding away from streams would be required where feasible to provide for streambank stability and water quality protection.

Ground-based Yarding

14. All ground-based yarding would be limited to slopes less than 35%. All ground-based yarding would be to designated or approved landings. No ground-based yarding would occur on sensitive soils.

15. Ground-based yarding operations would only occur when soil moisture content provides the most resistance to compaction (generally during the dry season), as approved by the Authorized Officer.

16. All ground-based skid trails would be pre-designated, approved by the Authorized Officer, and would occupy less than 10% of the tractor logged area. Existing skid trails would be used wherever possible. Trees would be felled to lead to the skid-trail. Ground based yarding could occur in Riparian Reserves.

17. All ground-based skid trails would be limited to 12 feet in width or less. Excavation (gouging) on skid trails would not exceed a maximum of one foot in depth. Ground-based skid trails would be decommissioned by tilling and blocking.

Road and Tractor (Skid) Trail Decommissioning Design Features

18. Tractor (skid) trails, natural surfaced renovated roads, newly constructed spur roads, and landings requiring operation during more than one dry season would be placed in an erosion-resistant condition and temporarily blocked prior to the onset of wet weather. This would include construction of drainage dips, water bars, lead-off ditches, and earthen/brush barricades. Only rocked or paved roads with little or no potential to deliver sediment directly to streams would be used for logging operations during the wet season.

19. After project completion, compacted skid trails would be tilled using appropriate "de-compaction" equipment and tools during the same dry season as falling and yarding, as approved by the Authorized Officer.

20. In order to minimize chronic sediment delivery to streams, and to comply with the Upper Lake Creek RAMP, newly constructed roads would be decommissioned as needed after project completion. Renovated roads not specifically identified in the Upper Lake Creek RAMP as "open" would also be decommissioned after project completion. Decommissioning may include any of the following measures:

    - discontinuing road maintenance
    - tilling the road surface with dozer and subsoiler implement or a track mounted excavator
    - removing gravel or pulling of gravel into the ditch line
    - scarifying roads for creation of planting areas
    - removing side cast soils from fill slopes with a high potential for triggering landslides

- filling and contouring cut slope ditch lines to the adjacent hill slope
- removing stream crossing culverts
- stabilizing stream crossings (e.g., recontouring stream channels, placing mulch or mats and seeding for erosion control, placing rock and logs)
- installing water bars, cross sloping or drainage dips to ensure adequate drainage into vegetated areas and away from streams or unstable road fills
- blocking using barricades, gating, or earth berm barriers
- placing slash, boulders, and/or woody debris on the road surface to deflect runoff, discourage motorized vehicle use, and promote vegetative growth
- seeding or planting for erosion control.

Botanical Design Features

21. In order to slow the spread of noxious weeds, all yarding and road construction equipment would be cleaned prior to arrival on BLM-managed land.

Wildlife Design Features

22. Seasonal restrictions would be placed on hauling and harvest activities within one quarter mile of unsurveyed suitable habitat to avoid disturbance to marbled murrelets during the critical nesting season (April 1- September 15). Activities during the late nesting season (August 6-September 15) would be restricted to two hours after sunrise to two hours before sunset.

Fuel Reduction Design Features

23. To reduce potential sources of intense fire behavior and long-range spotting in event of a wildfire, all landing piles not utilized for material to scatter over decommissioned roads, would be covered and burned.

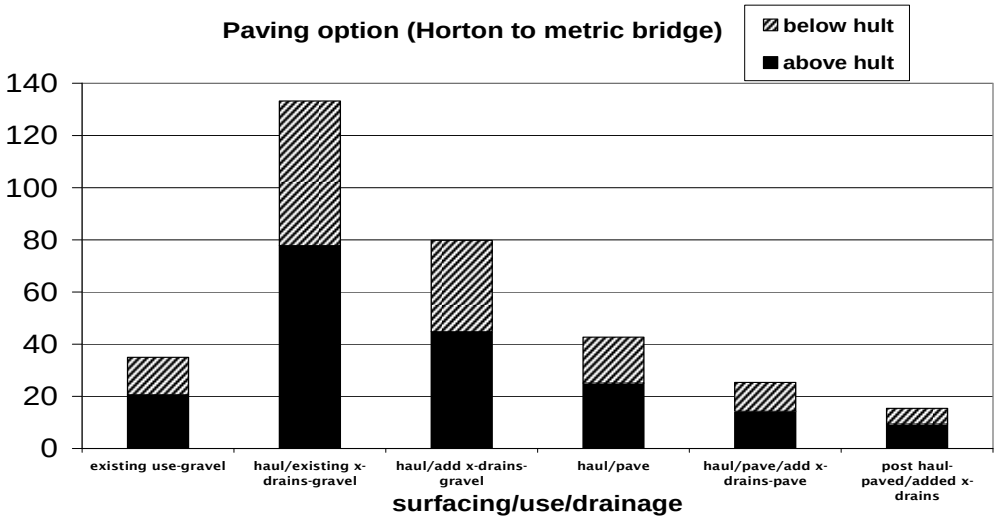
24. To reduce roadside fire intensity and increase safe ingress and egress for the public and fire fighters in event of a wildfire, slash within 25 feet of roads remaining open after harvest would be piled, covered and burned using a track mounted excavator. Material larger than 9" in diameter would be left out of the piles. Along paved roads where tracked equipment may damage the road surface, a 25 foot slash pull back will be completed by hand.

APPENDIX B

EFFECTS OF PAVING ON SEDIMENTATION

Graph 4 depicts the modeled benefit of paving and adding cross drains to 4 miles of main line haul road (Horton to Metric Bridge). The graph compares paving and adding cross drains under the action alternatives versus existing use and conditions under Alternative A. It also compares other types of treatment for each action alternative.

Graph 4. ***Paving***



The column to the far left is existing use with gravel surfacing. The next column to the right is the modeled increase in sediment from this road with no added cross drains and traffic use at the highest level. The third column from the left is the modeled increase from this road with added cross drains (where feasible) and traffic use at the highest level. The last two columns to the right show the short and long-term benefits of paving and adding cross drains. The modeled results indicate that paving and adding cross drains reduce delivery from this section of road below existing use levels even in the short term when traffic use increases. The results show that this treatment alone would reduce the projected increase for all the action alternatives in a noticeable way.

APPENDIX C

GLOSSARY

Anadromous fish – fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce, e.g. coho salmon and steelhead trout.

Basal area – the total cross-sectional area of all trees in a stand, measured outside the bark at breast height, usually expressed in square feet/acre or square meters/hectare.

Best Management Practices (BMP) - a suite of techniques that guide, or may be applied to, management actions, to aid in achieving desired outcomes. Best management practices are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory.

Canopy closure - the degree to which the canopy blocks sunlight or obscures the sky.

Clearcut - a timber harvest in which all or almost all of the trees in a stand are removed in one cutting.

Coarse woody debris - a tree or a portion of a tree that has fallen or been cut and left in the stand.

Commercial thinning - the harvest of generally merchantable trees from a stand, usually to encourage growth of the remaining trees.

Conformance - means that a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

Critical habitat - (1) Specific areas within the habitat occupied by a species at the time it is listed under the Endangered Species Act where there are physical or biological features (a) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (b) specific areas outside the habitat occupied by the species at the time it is listed upon the determination by the Secretary of the Interior that such areas are essential for the conservation of the species.

Crown - the upper part of a tree that carries the main system of branches and the foliage.

Cumulative effects - impacts on the environment resulting from the incremental effect of the action when added to effects of past, present, and reasonably foreseeable future actions regardless of the agency (federal or nonfederal) or person undertaking such other actions. Cumulative effects can result from individually minor, but collectively similar, actions occurring over a period of time.

Diameter at breast height (dbh) - the diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Effects - effects, impacts, and consequences, as used in this environmental impact statement, are synonymous. Effects may be direct, indirect, or cumulative and may fall in one of these categories: aesthetic, historic, cultural, economic, social, health, or ecological (such as effects on natural resources and on the components, structures, and functioning of affected ecosystems).

Endangered species - a species defined in accordance with the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act (ESA) - a federal law passed in 1973 to conserve species of wildlife and plants determined by the Director of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to be endangered or threatened with extinction in all or a significant portion of its range. Among other measures, ESA requires all federal agencies

to conserve these species and consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service on federal actions that may affect these species or their designated critical habitat.

Environmental Assessment (EA) - a systematic analysis of site-specific activities used to determine whether such activities would have a significant effect on the quality of the human environment, whether a formal environmental impact statement is required, and also to aid agency compliance with the National Environmental Policy Act when no environmental impact statement is necessary.

Environmental Impact Statement (EIS) - a statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the CEQ guidelines, and directives of the agency responsible for the project proposal.

Fragmentation - a process of reducing size and connectivity of stands that compose a forest.

Habitat - a place or environment where a plant or animal naturally or normally lives and grows.

Interdisciplinary team (ID team) - a group of individuals with varying areas of specialty assembled to solve a problem or perform a task.

Issue - a point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

Landing - a place on or adjacent to the logging site where logs are assembled for further transport.

Known site - historic and current location of a species reported by a credible source, available to field offices, and that does not require additional species verification or survey to locate the species.

Land use allocation - commitment of a given area of land or a resource to one or more specific uses (such as campgrounds or Wilderness). In the Northwest Forest Plan, one of the seven allocations of Congressionally Withdrawn Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Areas, Administratively Withdrawn Areas, Riparian Reserves, or Matrix.

Landscape - a heterogeneous land area with interacting ecosystems repeated in similar form throughout .

Late-successional forest - forest stands consisting of trees, structural attributes, supporting biological communities, and processes associated with old-growth and/or mature forests. Forest seral stages that include mature and old-growth age classes. Age is not necessarily a defining characteristic but has been used as a proxy or indicator in some usages. Minimum ages are typically 80 to 130 years, more or less, depending on the site quality, species, rate of stand development, and other factors.

Late-Successional Reserves (LSR) - a land use allocation under the Northwest Forest Plan with the objective to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth forest related species, including the northern spotted owl.

Matrix - a land use allocation under the Northwest Forest Plan of the federal lands outside of reserves, withdrawn areas, Managed Late-Successional Areas, and Adaptive Management Areas.

Mature forest - a subset of late-successional forests. Mature forests are characterized by the onset of slowed height growth, crown expansion, heavier limbs, gaps, some mortality in larger trees, and appearance of more shade-tolerant species or additional crown layers. In

Douglas-fir forests west of the Cascade Mountains, this stage typically begins between 80 and 130 years, depending on site conditions and stand history.

Mid-seral stands - forest stands that are not yet late-successional, defined here as stands 51-80 years old.

Mitigation measures - modifications of actions taken to: (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or, (5) compensate for impacts by replacing or providing substitute resources or environments.

National Environmental Policy Act (NEPA) - a federal law passed in 1969 to declare a National policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere, stimulates the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and established a Council on Environmental Quality.

Noxious weed - a plant specified by law as being especially undesirable, troublesome, and difficult to control.

Old-growth forest - an ecosystem distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species, composition, and ecosystem function. The Northwest Forest Plan SEIS and FEMAT describe old-growth forest as a forest stand usually at least 180 to 220 years old with moderate-to-high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

Overstory - trees that provide the uppermost layer of foliage in a forest with more than one roughly horizontal layer of foliage.

Plantation - a managed forest stand; defined in this EIS as a forest stand that has been established by planting or artificial seeding and has been pre-commercially thinned (or is too young to be pre-commercially thinned).

Pre-commercial thinning (PCT) - the silvicultural practice of cutting some of the trees less than merchantable size in a stand so that the remaining trees will grow faster, with the expectation of future commercial timber harvest. PCT is usually done in stands 10 - 20 years old.

Quadratic mean diameter - the average tree diameter of a stand, calculated as the square root of the sum of the squares of the tree diameters divided by the number of trees.

Record of Decision - a document separate from, but associated with, an environmental impact statement that: states the management decision, states the reason for that decision, identifies all alternatives including the environmentally preferable and selected alternatives, and also states whether all practicable measures to avoid environmental harm from the selected alternative have been adopted, and if not, why not.

Relative Density - a measure of the growing space available to the average tree in a stand; calculated as the basal area divided by the square root of the quadratic mean tree diameter (Curtis 1982).

Riparian Reserves - a land use allocation under the Northwest Forest Plan of areas along streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis.

Scoping - a process defined, according to the provisions of the National Environmental Policy Act, as an early and open process for determining the scope of the issues to be addressed and for identifying the significant issues related to a proposed action.

Seral stages - the series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage.

Slash - the branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging.

Snag - a standing dead, partially dead, or defective (cull) tree.

Special Forest Products - firewood, shake bolts, mushrooms, ferns, floral greens, berries, mosses, bark, grasses, etc. that could be harvested in accordance with the objectives and guidelines in the RMP.

Spur road - a branch of a main or secondary road; limited in this EIS to a short (<200') segment of road, usually to facilitate yarding or to provide access to a landing.

Stand (tree stand) - an aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition to be distinguishable from the forest in adjoining areas.

Stand density - a measurement of the number and size of trees on a forest site, which may be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density.

Stream reach - an individual 1st-order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. In this planning area, stream reaches are generally ½ to 1½ miles in length, except where channel character, confluence distribution, or management considerations require variance.

Succession - a series of dynamic changes by which one group of organisms succeeds another through stages leading to a potential natural community or climax. An example is development of a series of plant communities (called seral stages) following a major disturbance.

Suppression - the reduction in growth and development of trees as a result of competition with larger trees.

Survey and Manage - a mitigation measure adopted as a standard and guideline within the Northwest Forest Plan Record of Decision that is intended to mitigate impacts of land management efforts on those species that are closely associated with late-successional or old-growth forests and whose long-term persistence is a concern.

Threatened species - a species defined in accordance with the Endangered Species Act as being likely to become endangered throughout all or a significant portion of its range within the foreseeable future.

Understory - the trees and other woody species growing under the canopies of larger adjacent trees.

Watershed analysis - a systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis provides a basis for ecosystem management planning that is applied to watersheds of approximately 20 to 200 square miles.

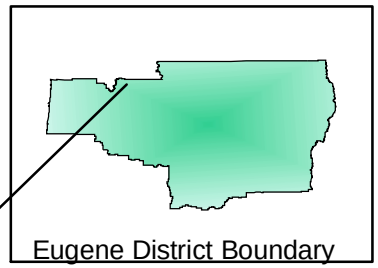
Wildfire - an unwanted wildland fire.

Windthrow - a tree or trees uprooted or felled by the wind.

Yarding - the act or process of moving logs to a landing.

Map 1

North Lake Creek Planning Area



T15S,R7W

Lake Creek

Hult Reservoir

0.5 0.25 0 0. 1 1. 2 Miles

Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Legend

- Existing Roads
- Streams
- Area of Critical Env. Concern
- Lakes, Ponds and Rivers

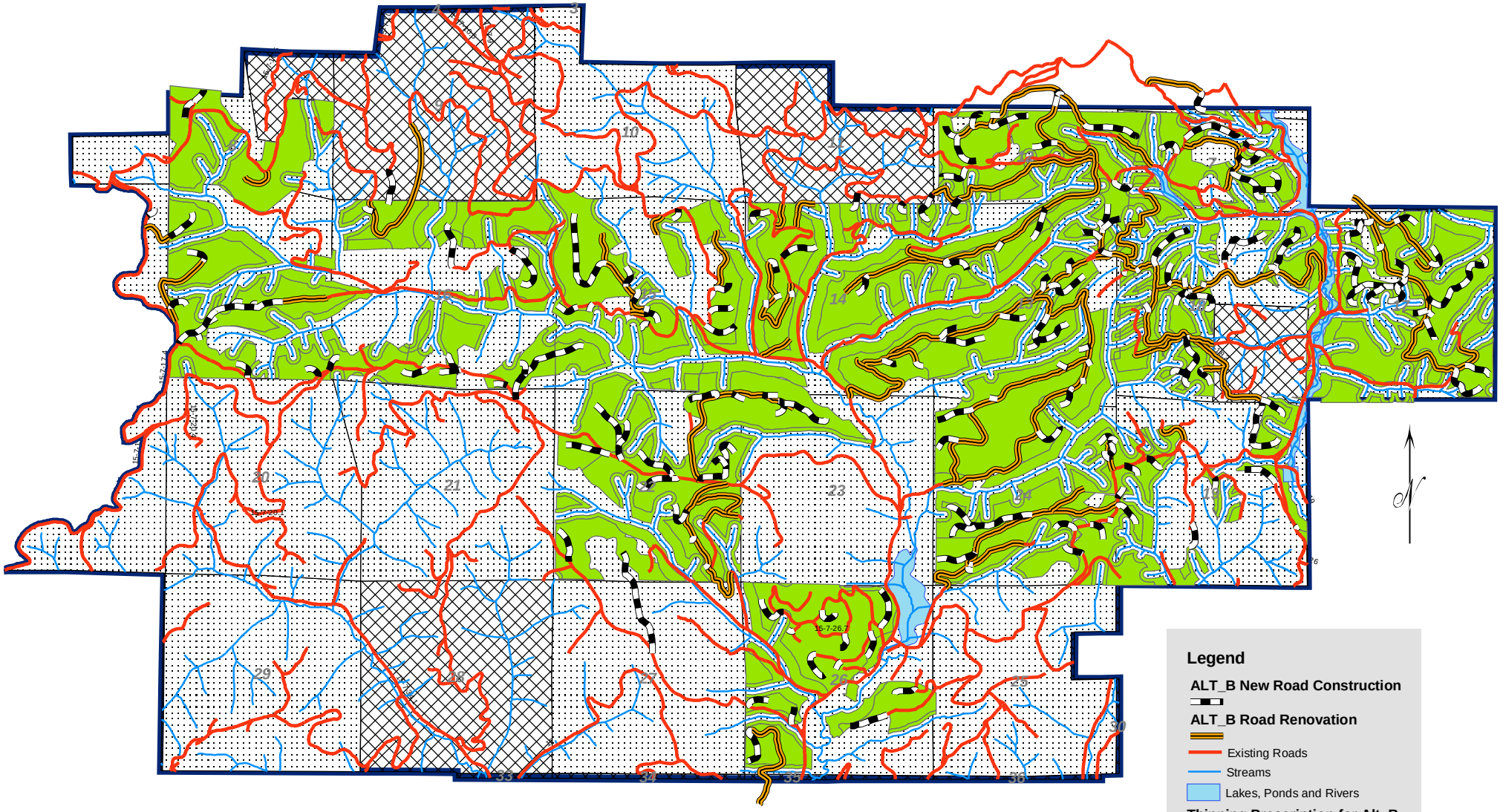
land ownership

- Private lands
- Section lines

Land Use Allocations

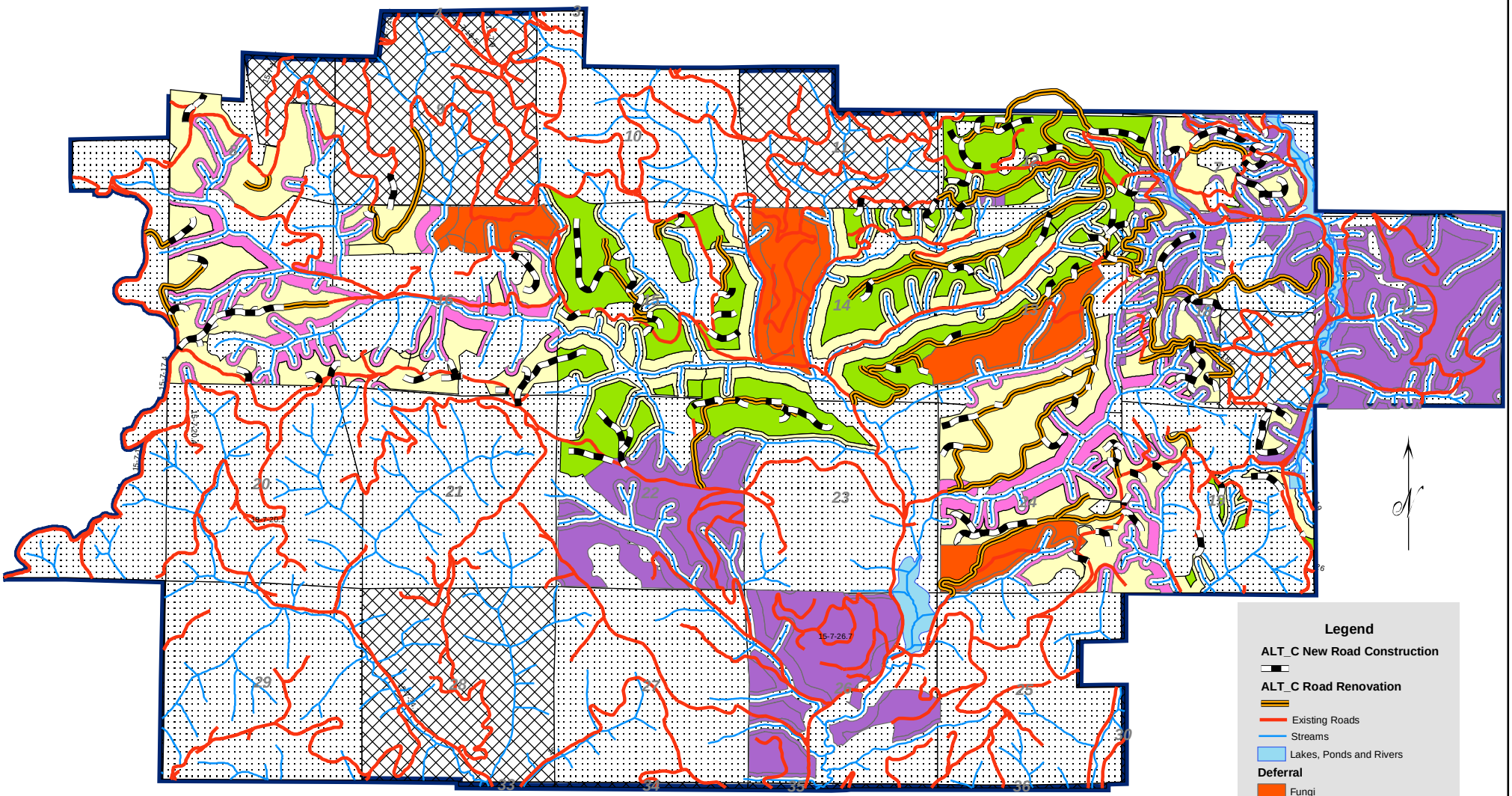
- General Forest Management
- Late Successional Reserve
- 5th Field Watershed boundaries

Map 2
North Lake Creek
Alternative B



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 3
North Lake Creek
Alternative C

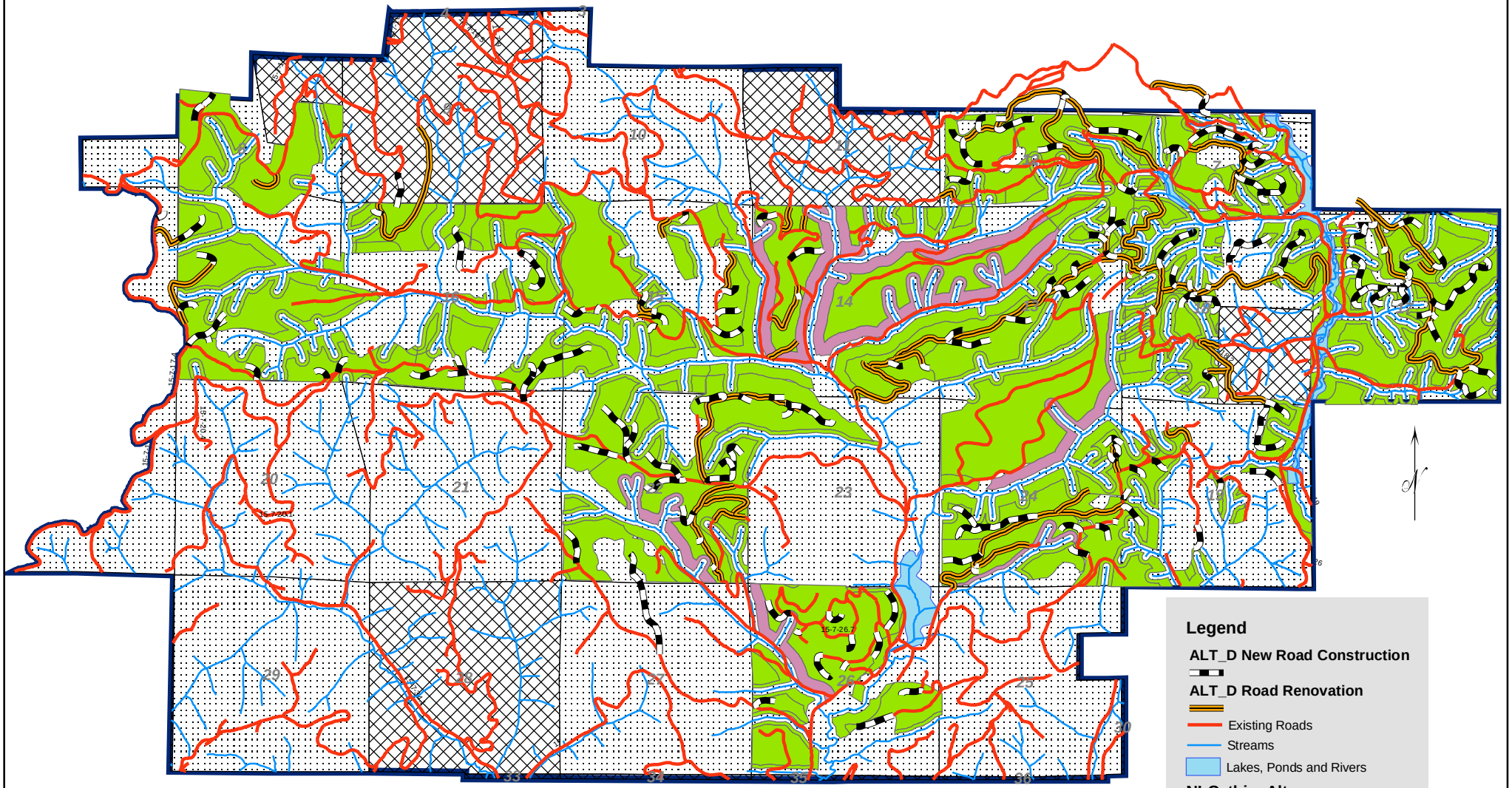


Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 4

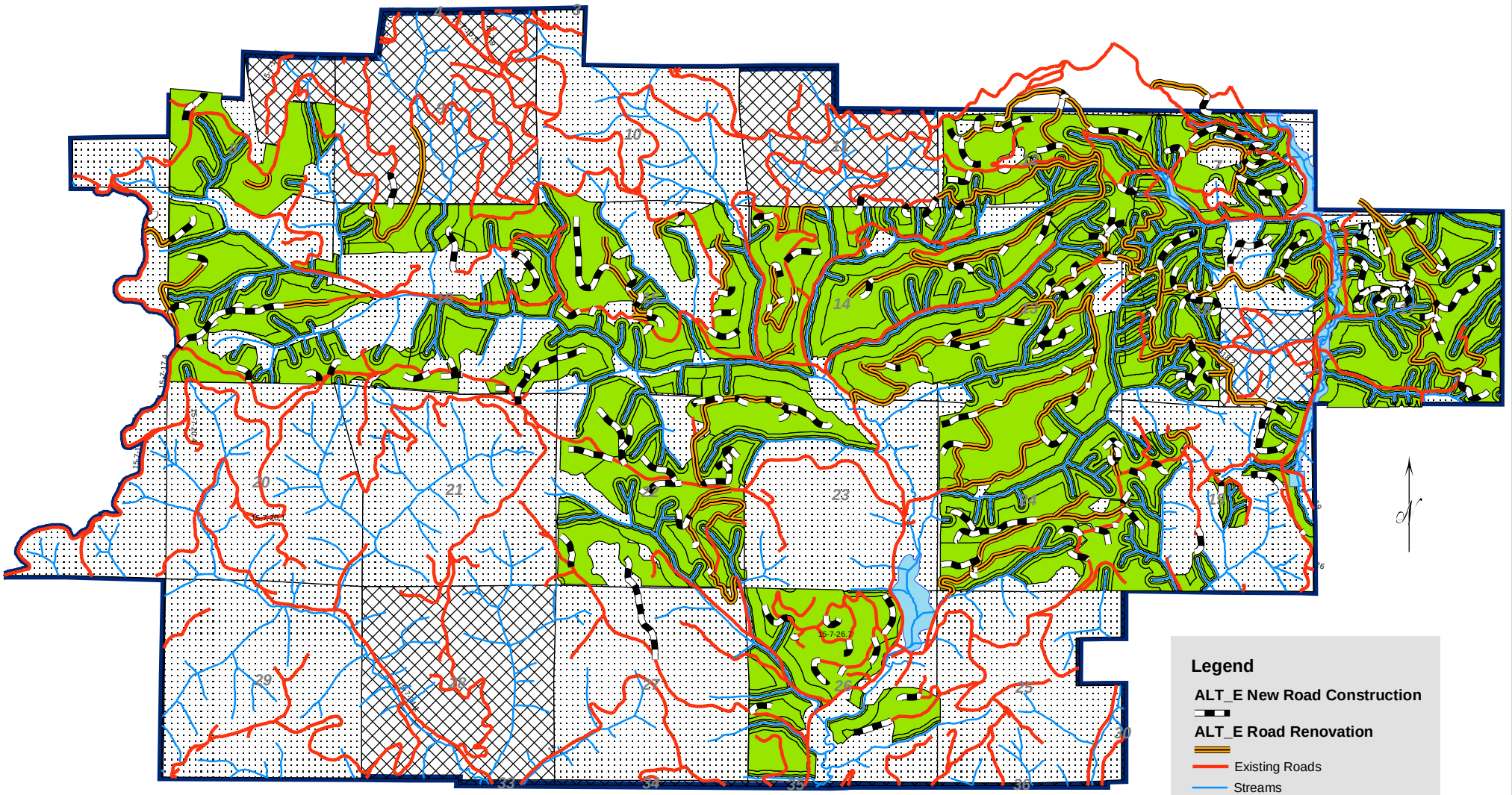
North Lake Creek

Alternative D



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

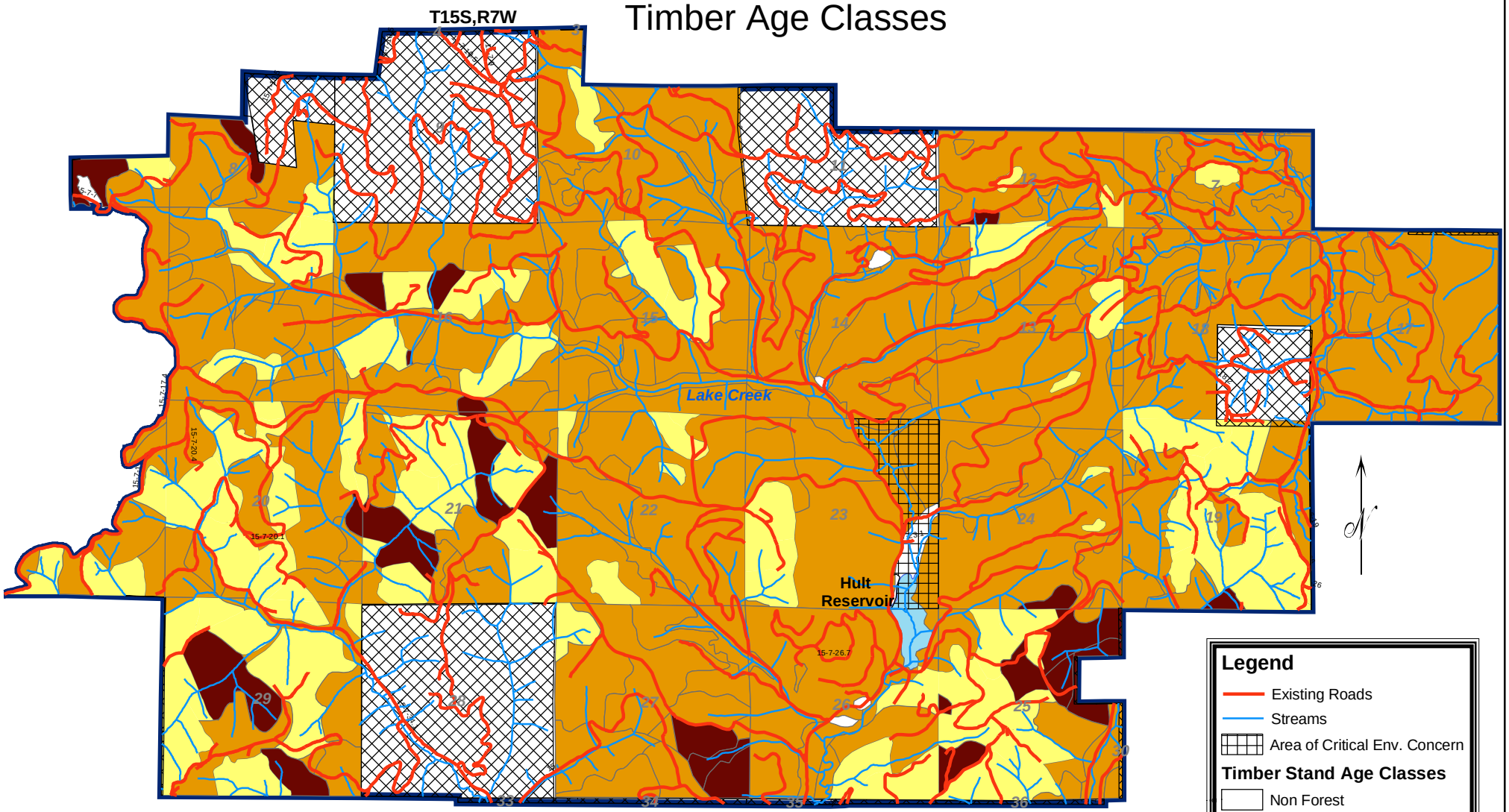
Map 5
North Lake Creek
Alternative E



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 6

North Lake Creek Planning Area Timber Age Classes



Legend

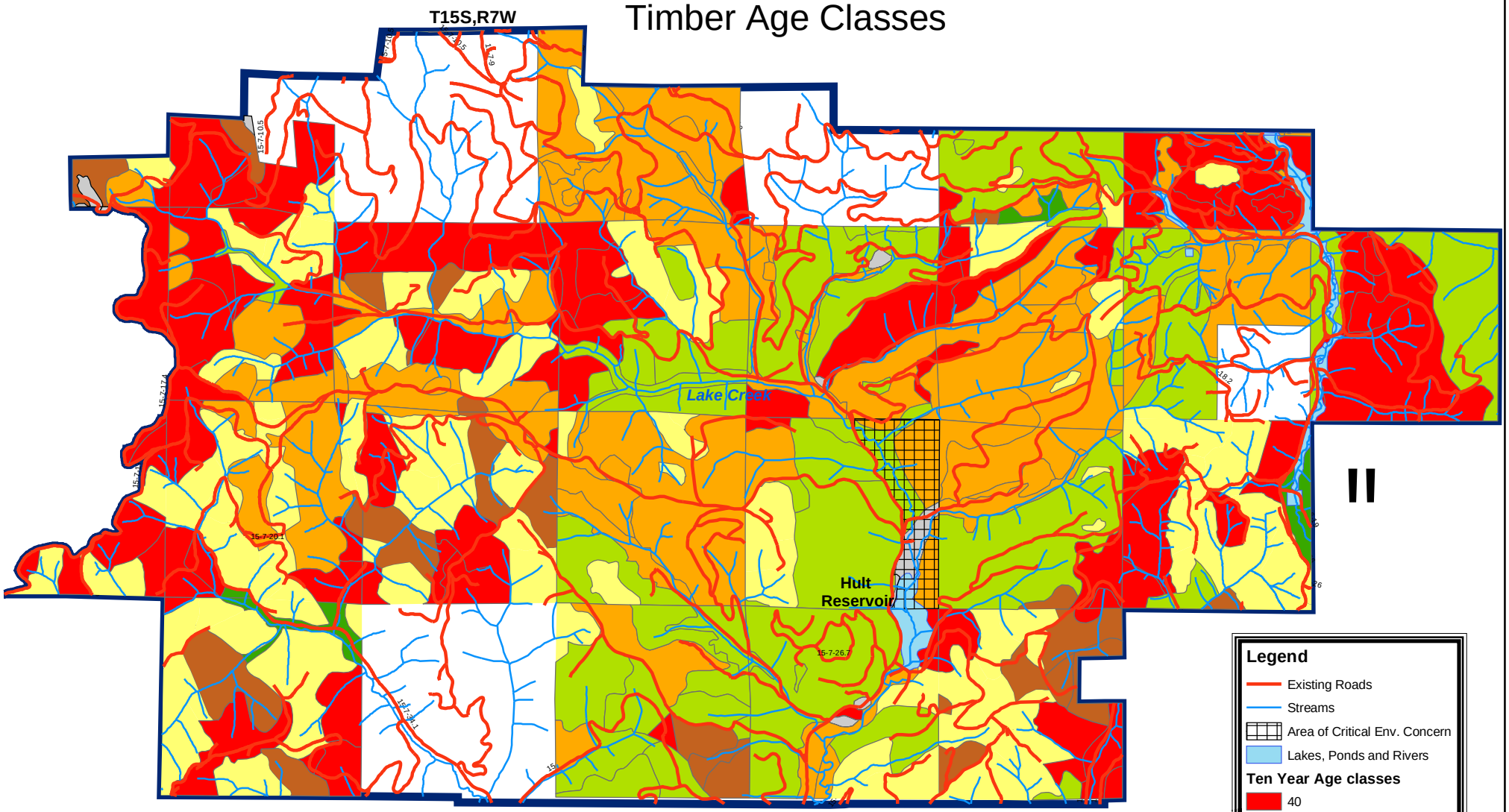
- Existing Roads
- Streams
- Area of Critical Env. Concern

Timber Stand Age Classes

- Non Forest
- 1 - 30
- 40 - 70
- 80 - 200
- Private lands
- Lakes, Ponds and Rivers

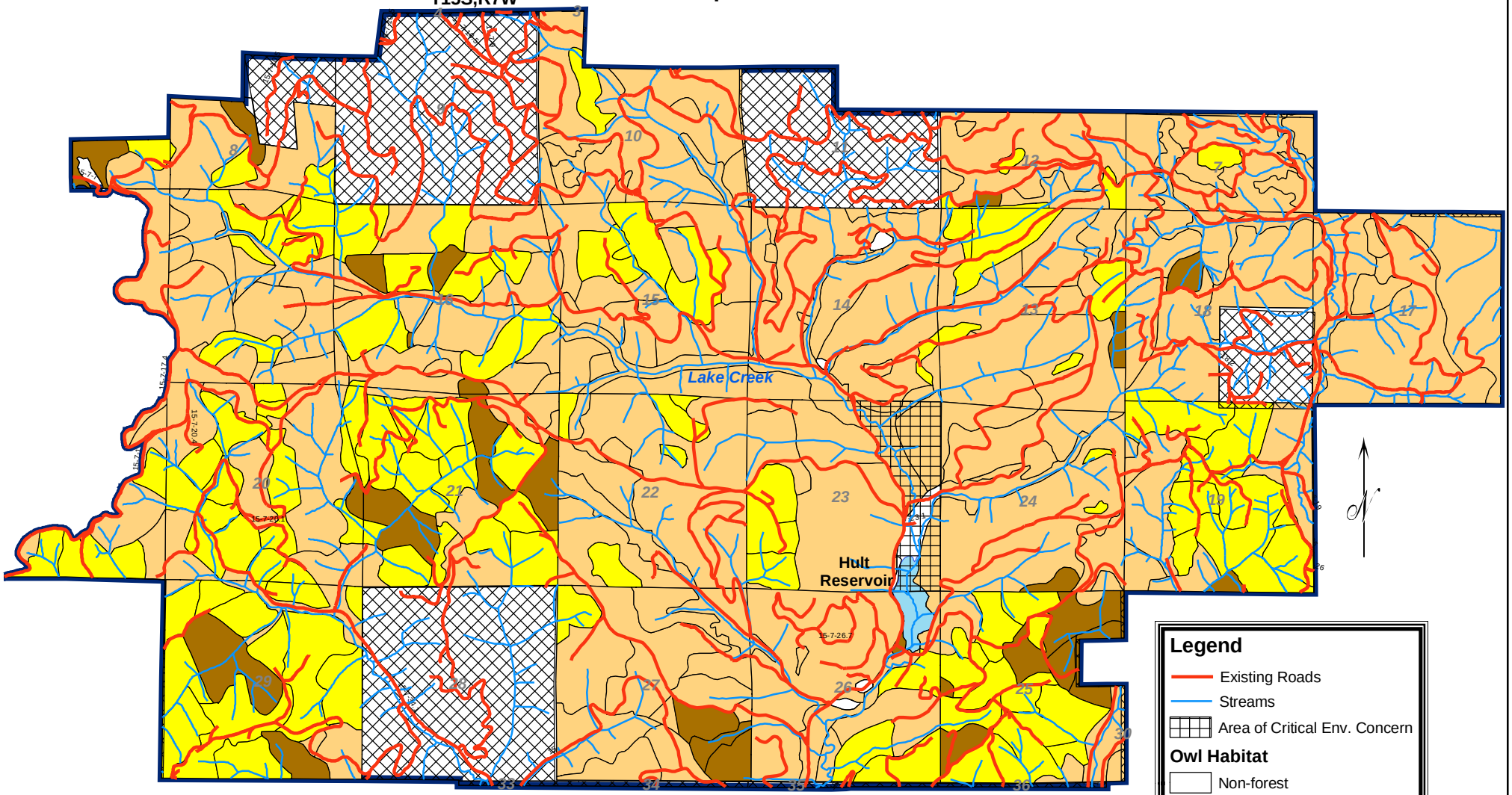
Map 6a

North Lake Creek Planning Area Timber Age Classes



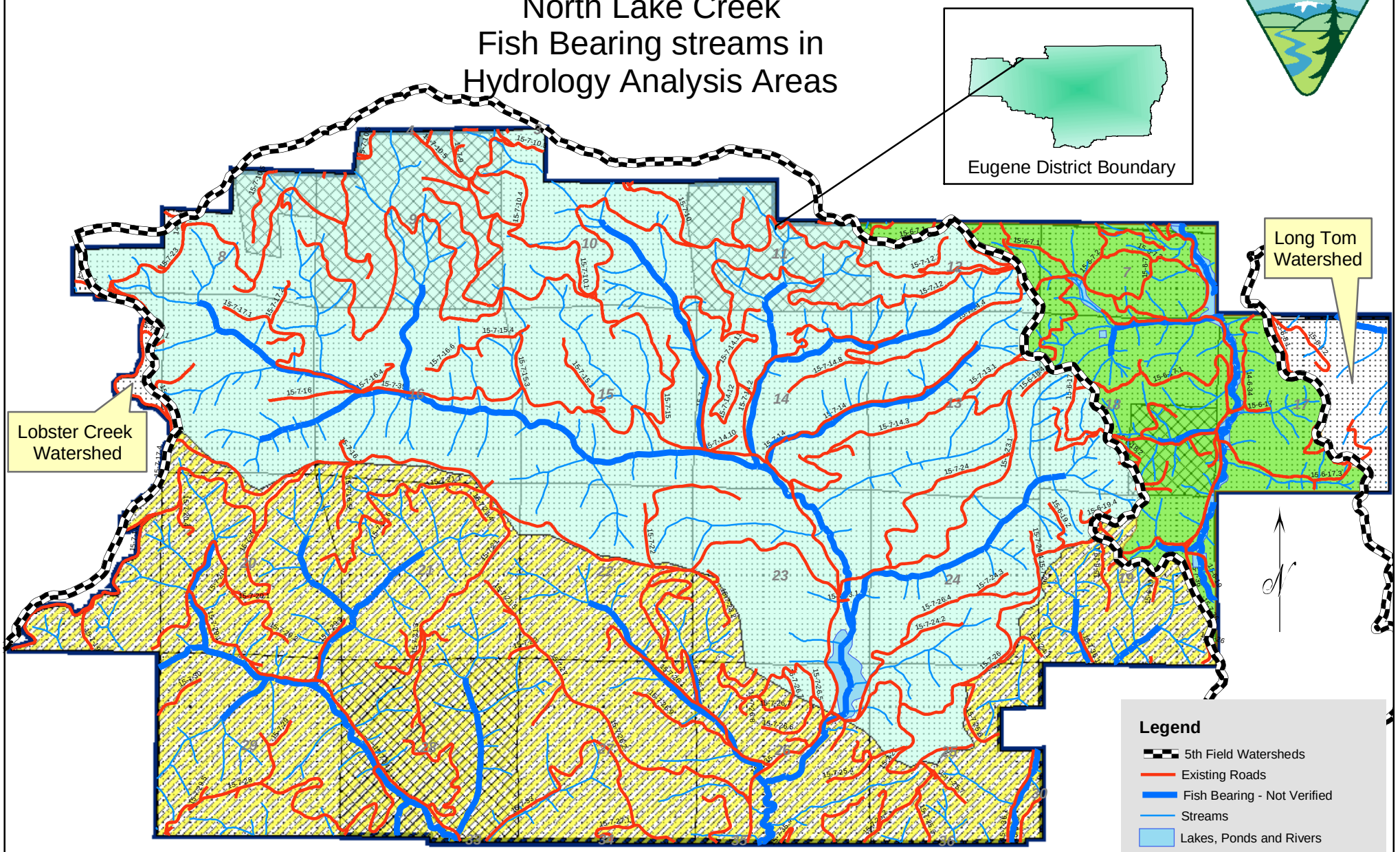
Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 7
North Lake Creek
Planning Area
Northern Spotted Owl Habitat



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 8
North Lake Creek
Fish Bearing streams in
Hydrology Analysis Areas

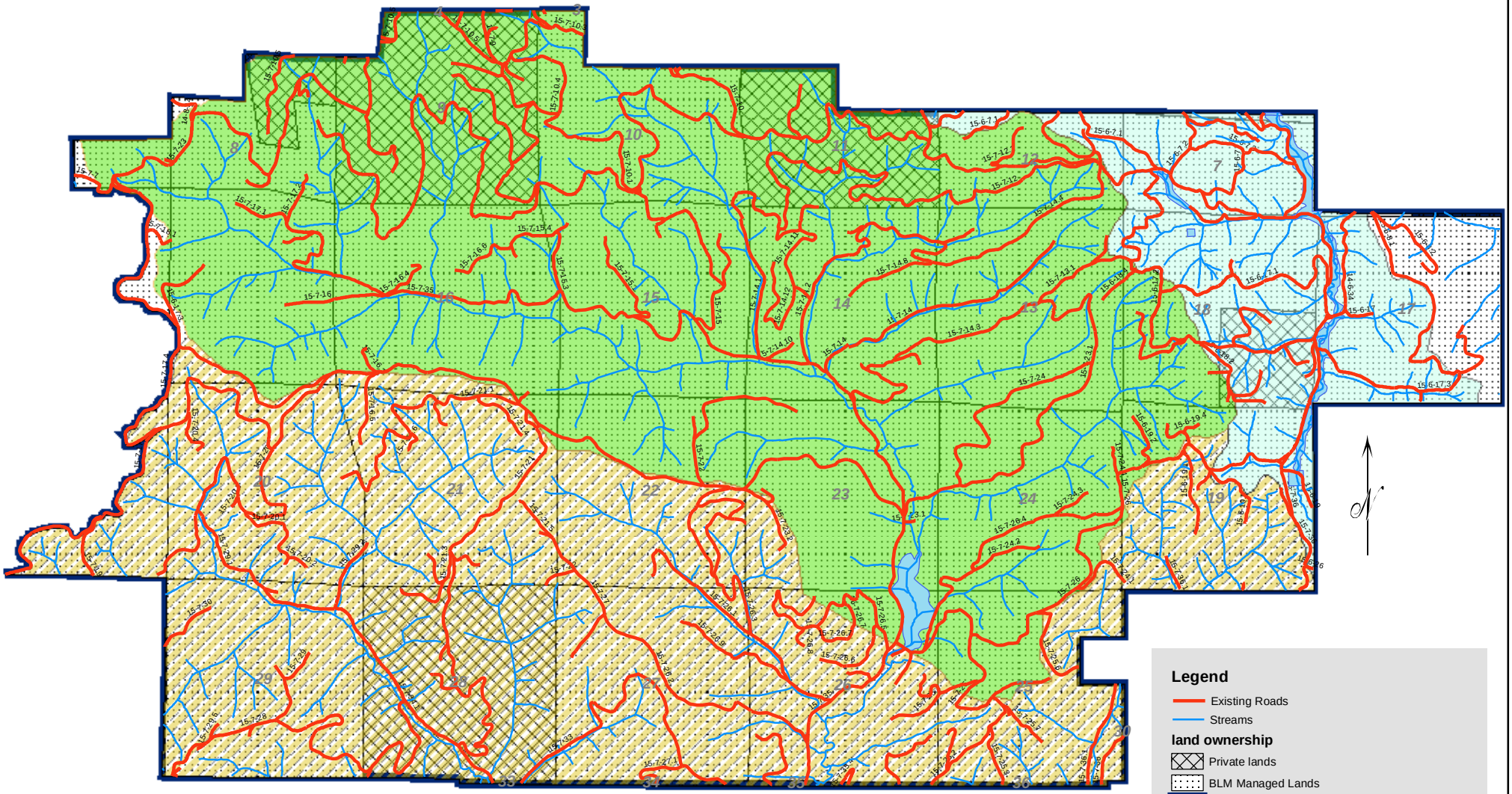


Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 9

North Lake Creek

Hydrology Analysis Areas



Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

1792A
EA-04-07
North Lake Creek

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE
DECISION RECORD and FINDING OF NO SIGNIFICANT IMPACT

North Lake Creek Thinning Project
Environmental Assessment OR090-04-07

BACKGROUND

The Bureau of Land Management prepared an Environmental Assessment (OR090-EA-04-07) which analyzed the effects of timber harvest within a 12,700-acre area around Hult Pond, north of Horton, Oregon. The EA considered a range of harvest alternatives from zero to 5,500 acres. The EA and Preliminary Finding of No Significant Impact (FONSI) were made available for a 30-day public review on May 26, 2004. Three comments were received.

The EA did not identify any alternative as a Proposed Action. Hereinafter, the Proposed Action shall refer to Alternative E, modified to include the heavy thinning in Riparian Reserves as described in Alternative D.

ADDITIONAL INFORMATION

Two minor clarifications have been made to the North Lake Creek EA.

1. On page 5, under the paragraph titled "Road Renovation," the last sentence should read "Activities could include clearing vegetation, grading, widening the road grade to minimum width standards, and adding a lift of rock."
2. On page 46, Design Feature No. 14 should read "All ground-based yarding would be limited to slopes less than 35%. All ground-based yarding would be to designated or approved landings. No ground-based yarding would occur on sensitive soils."

These two changes better align the action alternatives with the analytical assumptions used in the EA. The changes do not affect the analysis of effects.

On page 12, text was added to better describe harvest activities within the planning area. A new map (Map 6a) has been added to the EA that clarifies timber age classes in the planning area, in response to a comment received during public review of the EA.

Since the release of the EA for public review, field reconnaissance of three potential harvest units within the planning area revealed that the number of old logging roads is greater than estimated for the EA. We now estimate that the amount of new road construction necessary could be as much as 20 percent less than originally predicted.

Also, subsequent to the release of the EA for public review, BLM was notified by researchers from the Pacific Northwest Research Station that the Horton owl pair as described on page 15 had moved to a new location. Further monitoring showed that the Horton female and an unidentifiable male had successfully nested in a stand of mature timber in Section 16,T. 15 S, R. 7 W. Thus, the Horton owl home range becomes "inactive," and a new active home range (Upper Lake Creek) has been established and is considered "active." Relocation of the owls does not alter the effects analysis. As written, the EA discloses that approximately 24% (1,126 acres) of the suitable habitat in the Horton owl home range would remain intact under the Proposed Action. Applying the same design features within the new Upper Lake Creek owl home range results in approximately 26% (1,158 acres) of the suitable habitat remaining intact. The slight change in the amount of intact suitable habitat is not sufficient to alter the analytical conclusions in the EA.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the information contained in the EA (OR090-EA-04-07), and all other information available to me, it is my determination that: (1) the implementation of the Proposed Action or alternatives will not have significant environmental impacts beyond those already addressed in the "Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl," (April 1994) and the "Eugene District Record of Decision and Resource Management Plan," (June 1995); (2) the Proposed Action and alternatives are in conformance with the Eugene District Record of Decision and Resource Management Plan; and (3) the Proposed Action and alternatives do not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA or as articulated in the letters of comment.

Context

The Proposed Action would occur in the General Forest Management Area (GFMA) and Riparian Reserve Land Use Allocations (LUA) as designated by the Eugene District Resource Management Plan (RMP). The RMP anticipated that most timber harvest would come from the GFMA LUA, and that silvicultural treatments, such as density management thinnings, would occur in Riparian Reserves to help achieve the objectives of the Aquatic Conservation Strategy. The Proposed Action is in conformance with the Eugene District RMP.

Under the Proposed Action, commercial thinning would occur on approximately 5,500 acres of 40-70 year old timber in a 12,700 acre planning area. Forests in the planning area are primarily second growth Douglas-fir. Almost all of the planning area was subjected to intense clearcut harvest 40-60 years ago. No actions would take place within timber stands older than 80 years of age. Further, thinning in the near term does not establish a firm commitment to harvest these stands again in the future.

Intensity

I have considered the potential intensity/severity of the impacts anticipated from the North Lake Creek Thinning Project decision relative to each of the ten areas suggested for consideration by the CEQ. With regard to each:

1. ***Impacts that may be both beneficial and adverse.*** The EA considered both potential beneficial and adverse effects (see EA Table 15, pp. 39-40). None of the effects are beyond the range of effects analyzed in the Eugene District "Final Proposed Resource Management Plan/Environmental Impact Statement" (November 1994), to which the EA is tiered.

2. ***The degree to which the proposed action affects public health and safety.*** No aspect of the Proposed Action would have an effect on public health and safety.

3. ***Unique characteristics of the geographic area such as proximity of historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*** There are no known historic or cultural resource sites that would be affected by the Proposed Action. Past pre-project cultural resource surveys conducted in conjunction with surface-disturbing actions in the Coast Range physiographic province have not resulted in the discovery of significant cultural properties. The Oregon BLM and the Oregon Historic Preservation Office developed a protocol agreement recognizing the paucity of discoverable historic properties in the Coast Range. Under this protocol, pre-project cultural resource surveys are not needed in the Coast Range. There are no parks, prime farmlands, or wild and scenic rivers in the planning area. As field surveys for individual timber harvests are completed, wetlands may be found within harvest units. These will be protected according to provisions in the Aquatic Conservation Strategy described in the Eugene District RMP. One Area of Critical Environmental Concern (ACEC) is within the planning area, but no actions are planned to occur within the ACEC. None of the actions contemplated under the Proposed Action would affect the unique resources in the ACEC.

4. ***The degree to which the effects on the quality of the human environment are likely to be highly controversial.*** The effects of actions planned under the Proposed Action are similar to many other commercial thinning projects implemented within the scope of the Northwest Forest Plan and Eugene RMP. No unique or appreciable scientific controversy has been identified regarding the effects of the Proposed Action. Public comments received during the review of the EA suggest concern regarding effects to northern spotted owls, but no scientific controversy was identified. One commenter referenced a study that suggested thinning altered behavior of owls. The EA acknowledges that study and cites an earlier version (EA, p. 31).

5. ***The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*** The analysis has not shown that there would be any unique or unknown risks to the human environment not previously considered and analyzed in EISs to which this decision is tiered. Commercial thinning treatments have been pursued and accomplished for many years in the vegetation types typical of the planning area.

6. ***The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*** This project neither establishes a precedent nor represents a decision in principle about future actions. The Proposed Action is consistent with actions appropriate for the GFMA and Riparian Reserve land use allocations, as designated by the Eugene RMP. Commercial thinning in GFMA and density management reduction in Riparian Reserves are expected activities in these LUAs.

7. ***Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.*** The environmental analysis did not reveal any cumulative effects beyond those already analyzed in the EISs which accompanied the Northwest Forest Plan and Eugene RMP.

8. ***The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources.*** There are no features within the planning area that are listed or eligible for listing in the National Register of Historic Places. Public comment and tribal consultation did not reveal any significant scientific, cultural, or historic resources in the planning area (EA, p. 41).

9. ***The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*** Two threatened species are known to inhabit the planning area, northern spotted owls and marbled murrelets. No critical or suitable habitat for marbled murrelets would be treated under the Proposed Action. However, the Proposed Action *may affect, but is not likely to adversely affect* marbled murrelets due to potential disturbance from activities during the late nesting period. The Proposed Action *may affect, and is likely to adversely affect* northern spotted owls because of a reduction of intact foraging habitat within two active owl home ranges (EA, pp. 30-32). However, the Proposed Action would ultimately improve foraging habitat (EA, pp. 30-32). Thus, the degree of adverse impact is small and short term, and the overall impact on northern spotted owls is beneficial.

   Coho salmon are currently proposed for listing as threatened under the ESA. This species is present in the planning area only in the Lake Creek Watershed, and only below Hult Dam (EA, p. 18). Actions taken above Hult Dam and in the other watersheds within the planning area have been determined to have *no effect* on coho salmon. Actions taken below Hult Dam *may affect, but are not likely to adversely affect* coho salmon, primarily because of small, short term pulses of sediment created from culvert installation, replacement and removal. However, the EA notes that upgrading the road network will ultimately reduce the chronic sediment coming from the road network (EA, pp. 21-28). Conferencing with NOAA Fisheries will occur for individual projects that may affect coho salmon.

10. ***Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*** The Proposed Action does not threaten to violate any law. The Proposed Action is in compliance with the Eugene RMP, which provides direction for the protection of the environment on public lands.

DECISION

It is my decision to select Alternative E as described in the North Lake Creek Thinning Project EA, and to include the heavy thinning in 20% of the Riparian Reserves as described under Alternative D. "Terms and Conditions," "Standards Specific to Northern Spotted Owls," and "Standards Specific to Marbled Murrelets" have been provided by the USFWS in the Biological Opinion, and will be implemented (see "Consultation" below). The EA and the FONSI analyzed the selected alternative and found no significant impacts. Implementation of this decision will result in forest management activities, including thinning of GFMA and Riparian Reserve by commercial timber harvest, down wood creation in and near stream channels, road construction, renovation, and decommissioning. All design features identified in the EA will be implemented.

The selected alternative is in conformance with the "Eugene District Record of Decision and Resource Management Plan," (RMP, June 1995), as amended.

ALTERNATIVES

In addition to the selected alternative, the EA considered four other alternatives. Alternative A is the "No Action" alternative, and would carry out no management activities at this time. Alternative B would contribute to the District's Allowable Sale Quantity (ASQ), as well as provide for forest health and productivity. Alternative C would contribute a lesser amount to the District ASQ, but would have additional objectives for protection and enhancement of spotted owl habitat and mushroom productivity. Alternative D would contribute slightly more to the District ASQ than Alternative B, and would have additional objectives to further stand structure development in a portion of the Riparian Reserves and minimize short-term impacts to aquatic habitat. Alternative E, the Proposed Action, would contribute the most to the District ASQ, with additional objectives to enhance aquatic habitat complexity and structure.

RATIONALE FOR SELECTION

The purpose of the action is to provide a sustainable supply of timber while maintaining forest health and productivity, and to contribute to attainment of Aquatic Conservation Strategy (ACS) objectives. All of the action alternatives meet the purpose for taking action, to some degree.

The selected alternative would most effectively meet the purpose of the action. It would deliver the most timber volume at a competitive logging cost. The Proposed Action treats Riparian Reserves to promote ACS objectives in the long term: growing larger trees more quickly, replacing culverts that could cause sediment problems later, and adding CWD to streams. Heavy thinning on 20% of the Riparian Reserves would further accelerate development of late-successional forest characteristics. More spotted owl dispersal habitat would be degraded in the short term, and more owl foraging habitat is altered than Alternatives A or C. However, the North Lake Creek area is composed of the GFMA LUA, and such changes fit within the recovery scenario envisioned in the Northwest Forest Plan.

Alternative A (No Action) would not meet the purpose of the action within the GFMA or Riparian Reserve LUAs. It would not produce timber or maintain forest health (EA, p. 20). It would result in slower development of late-successional forest structural characteristics in Riparian Reserves than the action alternatives (EA, pp. 29, 32). Alternative A would have no short-term effects on northern spotted owl foraging or dispersal habitat (EA, pp. 30, 32).

Alternative B would meet the purpose of the action, but not as well as the Proposed Action. Alternative B would deliver a high volume of timber (EA, p. 20) at relatively low logging costs (EA, p. 38). However, some riparian timber treatments would be avoided, reducing short term risk, but also reducing long term benefits, compared to other action alternatives (EA, pp. 21-30). The effects on owls, invasive species, and mushrooms resemble the effects in Alternative E (EA, pp. 30-37).

Alternative C delivers the least timber of any action alternative (EA, p. 20, Table 15, p.39). Alternative C does the greatest amount of heavy thinning in Riparian Reserves (EA, pp. 6-7), further accelerating development of late-successional forest structure. However, this alternative thins fewer acres in Riparian Reserves than the other action alternatives (EA, p. 29). Because the Horton owls moved to a new location, Alternative C would not be effective at protecting existing spotted owl foraging habitat (EA, pp. 30-34).

Alternative D delivers a high volume of timber (EA, p. 20), but logging costs are projected to be about one-third higher than Alternatives B, C, and E because of increased use of helicopter logging (EA, pp. 37-38).

Alternative D provides some benefits for the Riparian Reserves, but also includes some risks. Heavy riparian thinning would result in long term benefits (EA, pp. 29-30). On the other hand, fewer aging culverts would be replaced, increasing the risk of creating sedimentation problems in the future (EA, p 28).

CONSULTATION AND COORDINATION

Public Scoping and Review

In August, 2003, a scoping letter was mailed to over 300 groups, businesses, local government agencies, and individuals, announcing that BLM was seeking help identifying issues and concerns regarding timber harvest in the North Lake Creek area. An open house was held at the Triangle Grange on September 4, 2003, and BLM staff was available during the Blachly Fair, September 7-8, 2003.

On May 26, 2004, the North Lake Creek EA was released for a 30-day public review and was sent to 12 groups or businesses, 9 state or local government agencies, and 15 individuals. In addition, a notice announcing the availability of the EA was sent to approximately 90 individuals who had received commercial mushroom harvesting permits for this area since October 2003. Three comment letters were received. A letter responding to comments and a copy of the Decision Record and Finding of No Significant Impact will be mailed to the commenters.

U.S. Fish and Wildlife Service

Pursuant to the Endangered Species Act, consultation was completed with the U.S. Fish and Wildlife Service, which concurred that the action "may affect, and is likely to adversely affect" northern spotted owls due to thinning activities within active owl home ranges, and "may affect, but is not likely to adversely affect" bald eagles and marbled murrelets (US Fish and Wildlife Service Biological Opinion, March 2005). The Service provided terms and conditions to minimize the incidental taking of spotted owls. These terms and conditions will be implemented as part of the Proposed Action. The terms and conditions are:

1. To delay the incidental taking of northern spotted owls associated with the Upper Lake Creek nest site, the BLM will defer, until October 1, 2006:

    a. Harvest activities in stands 40 to 49 years old in Section 16, T. 15 S., R. 7 W. with the following exception: This term and condition does not apply to harvest activities in the SW¼NW¼ or in the W½ SW¼ of Section 16, T. 15 S., R. 7 W. Harvest activities include road construction and renovation, the felling of trees and yarding.

    b. Road construction in the nest stand, which is that contiguous stand of trees 80 years old or older located in both the E½NW¼ and the W½NE¼ of Section 16, T. 15 S., R. 7 W.

2. To delay the incidental taking of northern spotted owls associated with the Alsea River nest site, the BLM will defer, until October 1, 2007:

    a. Harvest activities in those stands located both in Section 17, T.15 S., R. 6 W and east of the South Fork of the Alsea River. This term and condition does not apply to stands located west of the South Fork of the Alsea River in Section 17, T.15 S., R. 6 W or to stands outside Section 17, T.15 S., R. 6 W. Harvest activities include road construction and renovation, the felling of trees and yarding.

National Oceanic and Atmospheric Administration (NOAA Fisheries)

As of the signing of this Decision, coho salmon are proposed for listing as a "threatened" species under the Endangered Species Act. In accordance with current policy, BLM will confer with NOAA Fisheries on individual project-level actions that may affect coho salmon, while its status remains "proposed." If coho salmon are eventually listed as a threatened species, BLM will conduct individual project-level consultation with NOAA Fisheries on those actions that may affect coho salmon.

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires Federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) under the Act. The alternatives, as described and analyzed in this environmental assessment would have "No Effect" on waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians
The Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians were notified of this project during the scoping process, requesting information regarding tribal issues or concerns relative to the project. No response was received.

IMPLEMENTATION

Timber sales will be implemented with individual timber sale decision notices published in the Eugene Register-Guard. Prior to publishing the decision, we will conduct a "Documentation of Land Use Plan Conformance and NEPA Adequacy" (DNA) to determine whether additional NEPA analysis is necessary. Where site-specific conditions differ, or circumstances change, from those described in the EA, or if a DNA is inappropriate for other reasons, we may need to conduct additional NEPA analysis prior to reaching a decision to implement an action. However, such instances are expected to be the exception. For each timber sale, a sale-specific decision notice will be prepared (see "Administrative Review Opportunities" below). The public will generally receive notice of pending decisions through the District Quarterly Planning Update preceding the planned sale. Specific harvest unit locations will be described at that time. Timber sale decision documents will include descriptions of sale-specific design features, including sale boundaries, specific thinning prescriptions, yarding methods, temporary spur construction, road renovation, road decommissioning, and applicable Best Management Practices.

Wildlife and botanical clearances will be conducted prior to implementation of timber sales, in accordance with the RMP, as amended. Special status species sites discovered as a result of clearances or pre-disturbance surveys will be managed consistent with the Special Status Species policy. Identified special habitats will be managed consistent with the direction the RMP (RMP, pp. 39-41).

ADMINISTRATIVE REVIEW OPPORTUNITIES

This forest management decision may be protested under 43 CFR 5003 – Administrative Remedies. In accordance with 43 CFR 5003.2, the decision for this project will not be subject to protest until the notice of forest management decision is first published in the Eugene Register-Guard on June 8, 2005. Protests of the decision must be filed with this office within 15 days after first publication of the notice of decision. As interpreted by BLM, the regulations do not authorize acceptance of protests in any form other than a signed, paper document that is delivered to the physical address of the BLM office. Therefore, e-mail or facsimile protests will not be accepted. If no protest is received by the close of business (4:15 pm) on June 24, 2005, this decision will become final. If a timely protest is received, this decision will be reconsidered in light of the protest and other pertinent information available in accordance with 43 CFR 5003.3.

Future decisions on specific actions conducted under this restoration plan will have additional protest opportunities. The decision to implement individual timber sales will be subject to protest under 43 CFR 5003 when the notice of sale is first published in the Eugene Register-Guard. The published notice of sale will constitute the decision document for the purpose of protest of a timber sale (43 CFR 5003.2b). These future protest opportunities for timber sales will be limited to issues that could not have been raised in a protest of the broader forest management decision made in this decision.

/s/ Steven A. Calish — 6/7/05

Field Manager — Date
Siuslaw Resource Area